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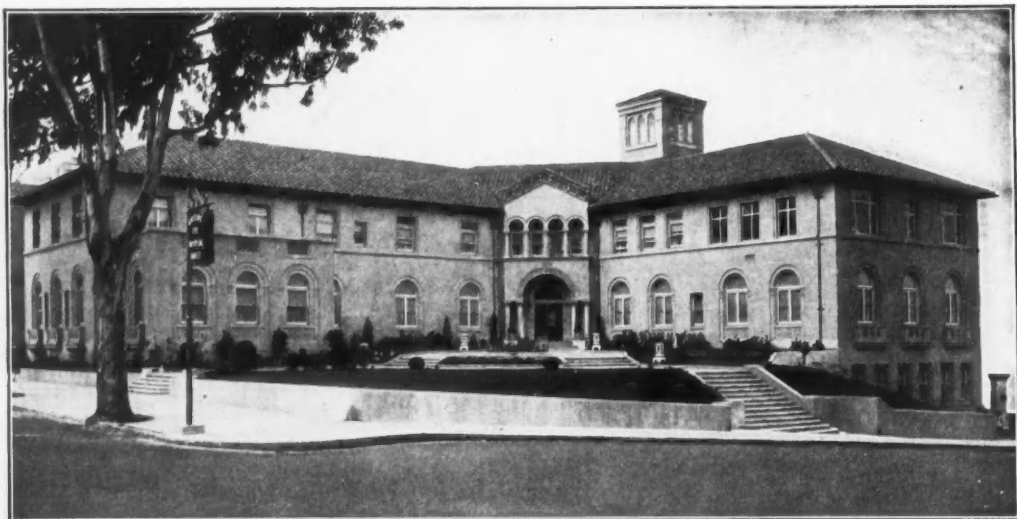
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RECENT ENDOCRINOLOGY*

By H. LISSER, M. D.
San Francisco

IN a paper read before this Association in 1926, I held, with regard to such conditions as cataract, glaucoma, retinitis pigmentosa, keratoconus, retinal hemorrhage and detachment of the retina, blue sclera, vasomotor rhinitis, hay fever and otosclerosis, that "in all of these conditions the fundamental cause remains obscure, even though the immediate or exciting cause may at times be recognizable. In all of them an incretory origin has been suspected, but in none of them has it been definitely established. It is not yet clear whether any relationship at all exists between endocrine disease and these important disturbances or malformations; or whether, if a relationship exists, it be direct in the sense of being due to an actual deficiency, or excess, of secretion from one or another ductless gland; or whether the relationship is more indirect; either through fundamental constitutional factors in which imbalance of the endocrine system plays a part, or, whether the mechanism of cause and effect be through the intermediation of the autonomic nervous system.

"The etiologic solution of these conditions is beset with difficulties and our knowledge of their endocrine affiliations is, at present, meager and inadequate. I would not wish to be misconstrued as denying the plausible and almost seductive theories which attempt to link up these puzzling maladies with endocrine derangements, but I deem it necessary to point out that any sweeping conclusions in respect to such possible relationships are, to say the least, injudicious and premature at this time."

I do not think that the situation in the interim has materially changed. The possible endocrine relationship of these disorders remains as intriguing but as illy defined as, for instance, the endocrine aspects of mental diseases. During several years I have attempted to administer hormone therapy to patients suffering from the eye, ear, nose, and throat disturbances above alluded to, but the experience has not been sufficiently extensive, nor the results sufficiently decisive, to warrant a report at this time.

For the above reasons, and because I am confident that such a progressive membership as yours would be interested in medical discoveries even though they have no immediate connection with your own specialty, I am taking the liberty of presenting to you some significant and rather recent developments in the field of endocrinology.

DIABETES AND ARTERIOSCLEROSIS

The brilliant discovery of insulin proved such a stirring stimulus to clinical and experimental investigation that the treatment of diabetes mellitus, during the "Banting Epoch," has been remarkably perfected. Certainly no adult diabetic need ever die of his diabetes *per se*; and, provided he does not die from accident or of some totally unrelated disease, his eventual death will not be due to diabetes itself but to the complications of diabetes, paramount among which is arteriosclerosis. The properly treated diabetic therefore has every chance to grow old and acquire senile degenerations. With the object of investigating the direct influence of diabetes upon the development of arteriosclerosis, my associate, Dr. H. Clare Shepardson, was afforded the opportunity (by Doctor Joslin) of studying intensively fifty cases of diabetes mellitus in individuals under forty years of age, who had had the disease at least five years. It is obvious that young patients were selected for this purpose, because if diabetes has any specific effect in producing arteriosclerosis this should be evident in individuals in the prearteriosclerotic age, namely, before forty years. Perhaps the most significant result of this study (which included the detection of early calcification of peripheral arteries by roentgen rays) was the surprising observation that arteriosclerosis was rather less frequent than previous reports seemed to indicate. After careful analysis of the data obtained from the anamnesis, clinical findings, diet, chemical investigations, and x-ray studies, Doctor Shepardson concluded that the explanation for this diminishing frequency of arteriosclerosis was probably to be found in the widespread and wiser use of insulin which permitted better utilization of fats and therefore less cholesterol storage. It is the latter factor in all likelihood which has a considerable bearing on the arteriosclerotic process. As a consequence of this improved therapy it is not unlikely that the ophthalmologist will, in future, see less diabetic retinitis than he does today.

*Read before the annual meeting of the Pacific Coast Oto-Ophthalmological Society, Salt Lake City, July 1, 1929.

HYPOPHYSEAL DIABETES

The Islands of Langerhans furnish insulin, and to this important extent are immediately and vitally concerned with carbohydrate metabolism, but the incretory portion of the pancreas is probably not the only component of the ductless glandular system regulating glucose tolerance. Whether the hypophysis plays a rôle under normal conditions is not clear at present, but it is increasingly apparent that profound disturbances of hypophyseal function have, as part of their widespread effects, alterations in glucose consumption and elimination. Cushing and Davidoff found twenty-five instances of hyperglycemia with or without glycosuria in one hundred verified cases of acromegaly, a percentage too high to be accounted for on the grounds of mere coincidence. By "verified cases" is meant the actual finding of the histological picture of a chromophilic adenoma, the invariable pathological cause of acromegaly. Indeed, this constant microscopic appearance may be contrasted with the inconstant, meager, and relatively unconvincing changes in the Langerhans tissue of the pancreas, supposedly the seat of diabetes mellitus. Except for minor details, the glycosuria and hyperglycemia of acromegaly is in most respects quite similar to the ordinary clinical picture of diabetes mellitus.

Since the idea of an independent and coincident diabetes in from 25 per cent to 40 per cent of acromegals may be summarily dismissed as an unwarranted straining of the laws of chance, we are forced to conclude that the impairment of carbohydrate metabolism accompanying acromegaly must be due to one of three functional deviations: (1) that the excessive secretion from the anterior lobe of the pituitary produces alterations in dextrose metabolism by antagonistic effect on insulin secretion or insulin activity. This assumption assigns the initial responsibility to the hypophysis which in turn secondarily influences the insular portion of the pancreas; (2) that the exaggerated secretion from the pars anterior, with its consequent visceromegaly, impairs the capacity of the liver to store glycogen; (3) or finally, that the hypophysis is primarily and solely responsible for the hyperglycemia and glycosuria.

With reference to the latter assumption it is interesting to note that Cushing and Davidoff report, in six cases of acromegaly, a definite lowering in the blood sugar levels following partial hypophysectomy. Allen and Lisser have recently published studies in a case of acromegaly in whom a similar lowering of blood sugar levels was accomplished by inhibitory roentgen ray therapy to the hypophysis. Radiation was employed in reducing hypophyseal function in the same manner and for the same purpose as when administered to the thyroid in a case of Graves' Disease. These results are at least suggestive of the possibility that direct therapeutic attack on the hypophysis itself is capable of influencing glucose tolerance. However, it remains unsettled whether

this effect is immediate and direct or through intermediation of the ductless glandular portion of the pancreas.

HYPOPHYSEAL INFANTILISM WITH HYPOGLYCEMIA

Many authorities have come to regard the syndrome of skeletal-genital-retardation-without-adiposity as specifically due to preadolescent deficiency of the anterior hypophysis. This hypofunctional state is the opposite of gigantism (preadolescent hyperpituitarism). Recalling the hyperglycemia of acromegaly, it is not surprising that the antithetical condition of hypoglycemia should occur when hypophyseal function is diminished. In this connection reference may be made to a lad of sixteen years who was an excellent example of this syndrome of hypophyseal infantilism. His father was just short of six feet in height and his older brother is slightly over six feet tall. His thirteen-year-old sister, although three years younger, was of the same height as the patient (4 feet 11½ inches). He was not obese. Secondary sex characteristics were absent; his face was smooth, entirely devoid of beard, and no axillary or pubic hair had yet appeared; his voice was still high-pitched; genitalia were infantile and he had never had seminal emissions. Although there was no evidence of pituitary tumor it was reasonable to assume a deficient function of the anterior hypophysis.

At this point it may be remarked that treatment with the anterior pituitary products now available is commonly regarded as fairly futile. The writer readily concedes that these commercial preparations leave much to be desired and are not comparable in standardization or potency to thyroid, adrenalin, pituitrin, insulin or parathormone; perhaps not even to the newer ovarian preparations standardized by the Allen and Doisy "spayed rat" method. Nevertheless the writer's experience forbids the assumption that these anterior pituitary products are entirely worthless. Results presently to be described, in the case above alluded to, were quite remarkable. The writer is aware that those critically minded will argue that the amazing improvement might have occurred in the natural course of events, without any organo-therapy at all. Nor can such a contention be disproved.

However this may be, the facts are as follows: Anterior lobe pituitary (Armour), grains five, put up in a salol-coated capsule, was administered three times daily, making fifteen grains per day. Patient continued this treatment faithfully for two and one-half years. No other treatment was administered. During this time he grew six inches, which is more than the normal rate of growth, and he became taller than his sister. Secondary sex characteristics had reached normality; there was abundant axillary and pubic hair, and patient was shaving regularly. Genitalia, which had been infantile, had reached full adult dimensions. Considering the specific nature of the treatment, it is interesting to note the effect on this patient's glucose tolerance. Before treatment the blood sugar was as follows: Fasting,

.079 milligrams per one hundred cubic centimeters; one-half hour after glucose, .091 milligrams per one hundred cubic centimeters; one hour after glucose, .066 milligrams per one hundred cubic centimeters; two hours after glucose, .047 milligrams per one hundred cubic centimeters. This is a strikingly "flat" curve showing hypoglycemia and markedly increased glucose tolerance, the precise opposite of what is found in acromegalic diabetes. After receiving corrective anterior pituitary therapy for two years, and with no changes in diet, a second glucose tolerance test showed a remarkable change: Fasting, .091 milligrams per one hundred cubic centimeters; one-half hour after glucose, .143 milligrams per one hundred cubic centimeters; one hour after glucose, .121 milligrams per one hundred cubic centimeters; two hours after glucose, .060 milligrams per one hundred cubic centimeters. This latter test demonstrates a decided change and may be considered normal. Specific replacement therapy was signally efficacious as regards growth, sex development, and glucose metabolism.

ACROMEGALY AND AMENORRHEA

Returning to the interesting malady, acromegaly, I wish to call attention to one of its common secondary effects, in women, amenorrhea. Davidoff, in a study of the symptomatology in 100 histologically verified cases of acromegaly, from Cushing's Clinic, reports that in forty-nine (87 per cent) of fifty-six female cases there existed a disturbance of the menstrual cycle amounting usually (in 73 per cent) to a complete amenorrhea by the time they first came under observation. This cessation in the forty-one cases occurred at an average age of only 31.4 years, "twenty years younger than the average normal time of menopause, which the recent studies of Dickenson and Pierson put at forty-nine years." "The frequency of premature cessation of menstruation occurring . . . so early in the disease, would at first sight appear to be incompatible with the conception of pituitary hyperactivity, for it is well known that in another and far more common type of pituitary disorder termed hypopituitarism, which is taken to be the exact antithesis of acromegaly, though also due to an adenoma of the gland, amenorrhea is an even more constant early symptom.

The experiments of Evans and his associates have thrown light on the subject. Their injections into female rats of anterior-lobe pituitary substance were originally made for the sake of studying the effects upon the oestrous cycle, and it was soon discovered that the hypophyseal extract very promptly interrupted this cycle. Later, however, in examining the ovaries of animals so treated, instead of finding shrunken, fibrosed organs, the ovaries were found to be actually larger than normal ones, and owing to their irregular surfaces were termed "mulberry ovaries." On microscopic examination these irregularities proved to be corpora lutea, each containing an undischarged and degenerated ovum.

Unfortunately there is no record of a satisfactory examination of the ovaries of a female acromegalic who was sufficiently young to have disclosed a condition—if indeed such a condition exists—analogous to the mulberry ovary produced in Evans' experimental animals. In any case, the frequent and early cessation of the menstrual cycle in acromegaly is so comparable to a similar effect produced upon the oestrous cycle of the rat by an excessive supply of anterior-lobe substance that a similar cause may certainly be assumed to be at work."

The writer has observed two typical cases of acromegaly in comparatively young women, both of whom gave a history of complete amenorrhea of four and seven years respectively when first seen. One patient was twenty-four years old and had ceased menstruating at twenty years of age; the other woman was thirty-three years of age and had ceased menstruating seven years before.

ANTERIOR PITUITARY HORMONE DIAGNOSIS OF PREGNANCY

It is an ever-recurring surprise and delight to witness discoveries in clinical medicine unraveled, amplified, and harmoniously linked with revelations from the experimental sciences, often many years intervening. Thus the recognition of amenorrhea, as a symptom of acromegaly, dates back fully twenty-five years, while Evans' experimental explanation (if such it be) is but two or three years old. Similarly, Erdheim and Stumme many years ago called attention to the invariable hypertrophy and hyperplasia of the anterior hypophysis during pregnancy. This cytological observation has had, recently, unexpected ramifications. I refer to the startling discovery by Zondek and Aschheim of the presence of anterior-lobe hormone in the urine of pregnant women. This was made possible by the important work of Stockard and Papanicolaou (1917) and Evans and Long (1922) which demonstrated the existence and the exact details of the cyclic estrual changes that occur in laboratory animals. From these fundamental studies standard tests have been evolved for the identification of an ovarian and an anterior pituitary hormone. The test for ovarian hormone consists in the production of characteristic estrual changes in adult spayed mice (Allen-Doisy Test); the anterior pituitary hormone will not produce estrus in a spayed animal. On the other hand, the test for the presence of anterior pituitary substance is the induction of estrus accompanied by ovulation in immature mice (Zondek and Aschheim test). About three years ago Zondek and Aschheim, and P. E. Smith, working independently, were able to induce precocious sexual maturity in young mice and rats by the implantation of anterior hypophyseal substance. As stated by Evans, "examination of the young animals after they had been killed showed that the effect was induced by a remarkable stimulus to ovarian development, a stimulus resulting in the ripening of an unusually large number of ovarian follicles and the liberation of eggs susceptible of fertilization." Follow-

ing up these observations Zondek and Aschheim, by injecting urine into immature mice as a test for pregnancy, found only four positive reactions in 254 controls, whereas the test was positive in 193 out of 197 specimens of urine from pregnant patients. Furthermore, the anterior pituitary hormone appears in the urine very soon after conception. This illuminating discovery will have its practical application in permitting a positive diagnosis of pregnancy much earlier than has been possible hitherto. Indeed the diagnosis has been made as early as the nineteenth day of pregnancy in a case where circumstances left no doubt as to the date when pregnancy originated. By this same Zondek and Aschheim test Fluhmann has recently been able to prove the presence of anterior pituitary hormone in the blood during pregnancy. This combined work of several scientific investigators in experimental research constitutes a useful contribution to the daily practice of medicine, especially obstetrics.

ANTAGONISM OF ANTERIOR HYPOPHYSAL GROWTH AND SEX HORMONES

Important researches during the last few years in the Anatomical Laboratories of the University of California, under the direction of Professor Evans, have contributed materially to our knowledge of the active hormonal principles in the anterior lobe of the mammalian hypophysis. It is now quite certain that there are at least two distinct and separable hormones obtainable from this glandular portion of the pituitary body. The growth hormone has been secured in a sterile, easily absorbable and almost protein-free solution. It is extremely potent and when administered parenterally to young rats produces indubitable gigantism. Its chemical concentration for clinical use in human beings is eagerly awaited, for it will then be possible to correct the dwarfism which characterizes hypophyseal infantilism, provided, of course, that the treatment is administered before epiphyseal unification prevents further growth. Evans also showed that this growth hormone induces lutein transformation in ovarian follicles in various stages of development, interfering therefore with ovulation by enclosing the ova in the abnormally constituted corpora lutea and preventing the occurrence of estrus during the time of administration of the hormone. It is thought, as stated elsewhere in the paper, that this experimental effect resembles and explains the amenorrhea of acromegaly. It was also demonstrated that an absolute loss in weight of the testis with lowering of sex interest occurs when males are treated in the same way with the growth hormone. A rather contrasting effect, however, was obtained by Zondek and Aschheim, and P. E. Smith, working independently, by daily implantations of fresh anterior pituitary substance into young mammals (mice and rats), namely, precocious sexual maturity. In other words it was shown that the anterior hypophysis produced a maturity-provoking or sex-stimulating hormone. Evans and Simpson have been able to separately extract the growth-stimulating hormone and the

maturity-provoking or sex-stimulating hormone. They have found, however, under certain conditions that an antagonistic action exists between them. *Alkaline* aqueous extracts were found to be maximally effective in stimulating growth in adult rats at levels which never provoke maturity in young animals. On the other hand *acid* aqueous extracts are effective in provoking maturity in young animals at levels which do not stimulate growth in adults. They found, furthermore, that alkaline and acid extracts of human placenta contain much of the maturity-provoking hormone, but little of the growth hormone. Also, that the urine of pregnant women (which, as mentioned before, has been utilized for the diagnosis of pregnancy) contains the maturity-provoking but not the growth hormone. The maturity-provoking hormone passes the Berkefeld filter in acid solution but the growth hormone does not do so; there are other chemical distinctions. Anterior hypophyseal extracts giving well marked growth effects nullify the maturity-provoking effect secured by other ways of administering anterior tissue. Whether the converse obtains, namely nullification of growth effects by administration of the sex hormone, is not yet established. These two important incursions come from two sharply separated hypophyseal cell types—the growth hormone from the eosinophilic cells of the anterior lobe, and the sex hormone from the basophilic cells of the anterior lobe.

HORMONES OF THE POSTERIOR HYPOPHYSIS

Recent work by Kamm and associates seems to reveal a similar separation for the hormones from the posterior lobe of the hypophysis. There was considerable discussion formerly as to whether the several characteristic effects of posterior lobe extracts (including extracts from the pars intermedia and neural stalk) originated from multiple specific crystalline principles (Fühner, Fenn, Dale, and Dudley) or whether these various effects were ascribable to one specific hormone. As recently as three or four years ago Abel and his associates championed the unitarian point of view. They were able to isolate an extraordinary potent principle, in the form of a tartrate, for which they did not claim entire chemical purity, but which they insisted possessed all the diverse physiological actions of a well-prepared aqueous extract, namely, powerful smooth muscle stimulation, prolonged rise in arterial pressure, brief diuretic action in the green-fed rabbit, and striking antidiuretic effect in diabetes insipidus. Kamm, however, claims to have separated two extracts which he has named "oxytocin and vasopressin" (also known as Pitocin and Pitressin); the former has a strong stimulating effect on smooth muscle but contains very little of the blood pressure raising principle; whereas the latter, vasopressin, produces a profound rise in blood pressure but little or no contraction of the uterus. These two posterior lobe extracts (or hormones?) are marketed separately in suitable ampoules.

PARATHORMONE

That the parathyroid glands have some special function was realized first about thirty years ago, when the syndrome of tetany was recognized as due to their inadvertent removal in the course of operations for goiter. Surgeons speedily appreciated the importance of conserving these tiny glandules. For the next twenty-five years our knowledge of parathyroid function made very little progress. That there was some relationship to calcium metabolism was suggested by the work of MacCallum and Voetglin, who demonstrated the relief to be obtained in tetany from the administration of calcium salts. It was not until 1924, however, that real interest in the parathyroids was rekindled through the announcement by Professor J. B. Collip of "the extraction of a parathyroid hormone which will prevent or control parathyroid tetany and which regulates the level of blood calcium." Soon thereafter reports began to appear of the clinical use of this new extract. There may prove to be a wider field of usefulness for this hormone than now appears to be the case, but its specific beneficial effect in tetania parathyreopriva, infantile tetany, and maternal tetany, has proved immensely valuable in the treatment of these dangerous maladies (Collip and Leitch, Davidson, Lissner and Shepardson, Snell, Hoag and Rivkin, Lissner Smith, Shepardson, and others). Thus another potent and biologically standardized ductless gland extract had been added to the list of thyroid, insulin, adrenalin and pituitrin.

HYPERPARATHYROIDISM

Until recently we had been familiar with the clinical complex of tetany resulting from an *inadequate* supply of parathyroid extract (*hypoparathyroidism*); but just as experience gained with insulin led to the recognition of a disease that results from spontaneous *overactivity* of the pancreas, namely, *hyperinsulinism*, so, in a similar manner familiarity with the hormone of the parathyroid gland has revealed another clinical entity, *hyperparathyroidism*. Barr, Bulger, and Dixon (1929) deserve the credit for first formulating the syndrome of hyperparathyroidism and reporting a typical case. It should be admitted, however, that Mandl, of the Hochenegg Clinic in Vienna (1926), and Gold from von Eiselsberg's Clinic (1927), had previously reported almost identical cases, also with extraordinary improvement following extirpation of a parathyroid adenoma, but without drawing the inference that they were dealing with a definite clinical entity due to exaggerated parathyroid secretion. The following evidence formed the basis for Barr's postulation of this strange clinical syndrome. Firstly—that benign multiple giant-celled tumors of bone, though rather rare, have been frequently found associated with osteomalacia; several of these cases were associated with parathyroid tumor or hyperplasia of the parathyroid; furthermore, some cases of osteomalacia have been complicated by bone cysts and bone swellings. Secondly—osteomalacia is associated with a nega-

tive calcium balance with increased excretion of calcium in the urine. Thirdly—that calcium renal stones with distressing urinary symptoms have been reported in cases of osteomalacia. Fourthly—a few cases of osteomalacia have been associated with muscular hypotonia (the opposite of the spasticity found in tetany) and complete inability to walk. Fifthly—in cases of osteomalacia associated with multiple cystic bone tumors, a high blood calcium has been found. Lastly—that Collip's Parathormone administered experimentally in excessive amounts produces (a) hypercalcemia, (b) increased urinary output of calcium and a negative calcium balance, (c) depletion of calcium in bone, and (d) muscular hypotonia. Barr and coworkers report the case of a woman aged fifty-six, who had a bilateral nephrolethiasis with urinary symptoms, marked muscular hypotonia with inability to walk, multiple giant cell sarcomata, areas of bone rarefaction, a blood serum calcium of 16 milligrams per one hundred cubic centimeters (normal, $9\frac{1}{2}$ to $10\frac{1}{2}$ milligrams per one hundred cubic centimeters), negative calcium balance with increased urinary calcium, and a nodule which at operation proved to be a parathyroid adenoma. Removal of the parathyroid tumor was followed by a prompt drop in the blood serum calcium (with temporary tetany), a positive calcium balance, and tightening of the teeth which had become loose. Barr, Bulger, and Dixon concluded that this mass of evidence justified the pronouncement of a new clinical syndrome, hyperparathyroidism, as definite and distinct as parathyroid tetany, exophthalmic goiter, myxedema, or acromegaly. In the short time since their article appeared, two more instances of this remarkable syndrome, including successful removal of a parathyroid tumor, have been reported by Wilder, Boyd, Milgram and Stearns.

Earlier in the paper the writer commented on the correlations which evolve between clinical medicine and the preclinical sciences and how bedside observations are elaborated, ripened and refined, sometimes a generation later, by discoveries in experimental laboratories. In the matter just reviewed we observe an instance of revelations the other way about, that is to say, a discovery of the chemical-physiological laboratory leading to the recognition of a new clinical syndrome. Thus a rather rare and puzzling malady, osteitis fibrosa, is now understandable as the bone-rarefying effect of an excessive parathyroid secretion.

PRESENT STATUS OF ORGANOTHERAPY

In conclusion let me recall to your minds the trustworthy hormones available to us as supplementary therapy for specific endocrine deficiencies. These include, in the order of their discovery, thyroid substance, adrenalin from the medullary portion of the suprarenals, pituitrin from the pars intermedia and posterior lobe of the hypophysis, insulin from the incretory portion of the pancreas, and parathormone from the parathyroids. A hint has been given earlier in this paper of some success with anterior pituitary products

though their efficacy is not to be compared with the five hormones just referred to. That we may hope for extremely potent growth-stimulating and maturity-provoking hormones from the anterior hypophysis has been alluded to in the description of Evans' brilliant experimental investigations.* The newer ovarian preparations, standardized biologically by the Allen-Doisey spayed-rat method, bid fair to excel the products formerly available. Ovarian extracts are now being prepared from the placenta and from amniotic fluid since recent researches have demonstrated the presence of the ovarian hormone from these sources. Some of the recent hypodermic preparations of these substances have been found quite efficacious in restoring menstruation, but their use has been somewhat hindered by the painfulness of the injections. A modification which promises to obviate both this pain and the inconvenience of repeated piqures consists in administering the hormone in the form of vaginal pessaries since the vaginal mucosa readily absorbs the extract. As yet, no satisfactory extracts of testicular tissue, pineal body, or thymus have been prepared; and there is indeed some question as to whether the thymus is in truth a ductless gland.

Although adrenalin has proven of invaluable service because of its pharmacodynamic properties (as in the treatment of asthma) it has failed signally in the treatment of Addison's Disease, the only malady which we can positively attribute to adrenal inadequacy. It has become more and more apparent that this rather rare and invariably fatal disease results not only from failure on the part of the adrenal medulla, but what is probably of more vital consequence, from lack of hormones from the *cortical* portion of the suprarenals. To date no satisfactory preparation of adrenal cortex has been marketed commercially but my closing message to you is the hopeful news that such a product seems about to be achieved. The encouraging rumors, if one may so term them, emanate from two clinics in this country, namely, the experimental laboratories of Stewart and Rogoff at Western Reserve University, Cleveland, and Koehler's Laboratory in McLean's Clinic of the University of Chicago. The former investigators have conducted important experimental researches on adrenal insufficiency for many years and were finally able to so perfect their technique that dogs survived total extirpation of the adrenals for many weeks, thus producing a state of subacute adrenal deficiency. This had formerly been impossible. An experimental state of chronic deficiency such as we recognize in human beings as Addison's Disease, has not been achieved as yet. From these researches they developed an extract to combat the adrenal deficiency, from the cortex of the suprarenals, which they appropriately named "interrenalin." Preliminary reports indicate that this extract has been useful in combating clinical instances of

Addison's Disease. If a truly potent product is eventually obtained, we may reasonably hope to relieve many cases of mild asthenia and hypotension which resemble Addison's Disease, except for the absence of pigmentation and fatal termination.

In sketching these recent developments in endocrinology, the writer does not pretend to have covered all the painstaking labors of the last few years throughout the world in this fascinating field of medicine. It may have been noticed for instance that no mention has been made of experimental or clinical investigations concerning the thyroid gland, principally because the newer contributions have been in the nature of refinement, rather than of arresting novelty. Nor is it claimed that all noteworthy discoveries in the broad field of endocrinology have been given proper recognition. This could hardly be expected in a limited address.

It is hoped nevertheless that these glimpses into an increasingly important field of medicine will have proved of interest to the members of your society.

384 Post Street.

CAUSES OF FAILURE IN THE MEDICAL MANAGEMENT OF PEPTIC ULCER*

By FRED H. KRUSE, M. D.
San Francisco

DISCUSSION by Frederick A. Speik, M. D., Los Angeles;
Henry Snure, M. D., Los Angeles; Roland Cummings,
M. D., Los Angeles.

THE treatment and management of peptic ulcer is essentially a medical problem. Even after the surgeon has attempted skillfully to restore the disordered mechanics of the upper gastrointestinal tract, and has built a way around or boldly attacked the indurated and fibrosed ulcer-bearing tissue, still, the imminence of further complications and the needs of the patient demand vigilant and efficient guidance. I have always liked the expression of Dr. Robert C. Coffey, that surgical interference in peptic ulcer is simply a mechanical measure used as an aid to medical treatment.

There is, or should be, no contest between surgical treatment and medical treatment. Surgical aid is just as indispensable in certain cases of peptic ulcer as it is in diabetes to remove a hopelessly gangrenous appendage.

However, it should be generally recognized that since medical treatment implies the control of a relatively chronic condition or tendency, medical procedures to be successful must be carried out meticulously and in detail, without interruption, and with a sufficiently prolonged and efficient supervision, a supervision that takes ready cognizance of variations in the patient's condition and symptoms.

No regimen which simply includes diet, some powders, and a sheet of written directions will

* Since this paper was written Collip has announced the isolation and concentration of an ovary-stimulating hormone from human placenta. He states that it is effective orally. This extract may prove to be identical with the anterior pituitary sex hormone.

* Read before the General Medicine Section of the California Medical Association at the fifty-eighth annual session at Coronado, May 6-9, 1929.

ever succeed in the control of peptic ulcer. Furthermore, as in tuberculosis, if we can see the patient early and apply the "cure" the chance of an ultimate complete relief is greatly enhanced. The patients who cannot be controlled, or who do not understand the importance of carrying out the details of the treatment, who were not properly directed at first, or who continually slip from their regimen when better or symptom free, form a group with the highest percentage of failures in the medical management of peptic ulcer.

Of this I am convinced, after analyzing a number of histories of patients going to operation at the University of California Hospital. Surgery then was apparently indicated for several reasons, but, while nearly all stated their trouble had advanced in spite of medical treatment, and were classified as medical failures, in practically no instance did I consider their past regimen had been adequate or sufficient.

The therapy of peptic ulcer has been written and rewritten. There has been no noteworthy contribution to this subject since Sippy's article in 1912. There has been a voluminous literature, many proposals, and much controversy, but the basic essentials of treatment have not been materially altered. Methods have been refined and perfected and details added, but there has been nothing which has revolutionized our thoughts or procedures since then.

We eagerly scan the medical reviews for some new hope or inspiration in the control of essential hypertension, and race off on various therapeutic tangents, only ultimately to resume the essentials of rest, diet, and environmental control. We have our fads and fancies; but, as a group, we realize that the day-to-day control and the persistence of intelligently directed efforts accomplish the most.

ADEQUATE MEDICAL MANAGEMENT

In ulcer management we must have firm convictions and definite aims and procedures, and yet a plan not too inflexible, one adaptable to the type of individual and environment with whom and with which we are dealing.

Adequate medical management implies:

1. Surgical aid in perforating, dangerously penetrating, organically stenosing ulcers, and in the large infiltrating types, with a long chronic history of recurrences, in patients vocationally and psychologically unfitted for prolonged medical regimens. I should like to emphasize, however, that the findings of food retention and large six-hour barium residues do not mean hopeless stenoses until it can be shown that an efficient medical treatment has not or cannot change these conditions. The factors of spasm and tissue edema and swelling about or near an active ulcer must be eliminated. Cases of hemorrhage must be handled upon their individual indications; they are essentially medical cases.

2. *Initial hospital or home rest*, be it only for a week or several weeks until relaxation and the proper mastery of the regimen has been obtained.

3. Diet.

4. Medication.

5. Absolute elimination of ulcer symptoms; and proper bowel control by the method instituted.

6. Removal of contributing etiological factors such as (a) focal infections (in the head, abdomen, pelvis, or elsewhere), (b) unfavorable habits (in use of food, drink, and tobacco), and (c) nervous tension, either mental unrest and fears, or hyperactivity of the sympathetic system.

7. Continued education of the patient as to the nature of his disorder, the pitfalls in its treatment and the dangers of future recurrences, with an adequate plan to meet the first recurring symptoms.

AVOIDANCE OF CHRONICITY

Our most immediate concern in initiating a plan for ulcer management is to overcome the factors that prevent healing of the ulcer, and thus render it chronic. In respect to the above, essentially two schools of thought or theories of procedure have arisen in the treatment of peptic ulcer by medical methods.

The first we might term the "mechanical theory," based on the idea that increased gastric tension, hyperperistalsis, pylorospasm, etc., are the chief influences that prevent the ulcer from healing. Based on these assumptions, we have the so-called starvation plan of treatment with stinted diets and rectal therapy; and the smooth, non-residue diet, with frequent feedings of Alvarez.

The second, or "chemical theory," conceives that the secretions of the stomach and the resultant mixture with food, on account of chemical irritation and erosion of areas of malnutrition in the peptic region, produce the ulcer and prevent its healing. Therefore, this therapy is based on chemical neutralization by alkalis, the notable exponent of which, of course, is the Sippy treatment.

A third idea that peptic ulcers are a sensitization phenomena and form from blebs and areas of local edema due to hypersensitization to certain irritants (endogenous or exogenous) has led to foreign protein therapy, especially milk injections, novoprotein, and to efforts along the line of specific desensitization.

As yet, no conclusive evidence of the efficacy of this method of treatment has been produced.

Whoever attempts to treat peptic ulcer should have positive views on the proper method of procedure and definite aims or ends to attain as a check of the value of his therapy. Too much modification in the plan, too ready acquiescence to the whims of the patient, and the changing from one conception to another, lay a ready foundation for medical treatment failure.

I would establish as a first rule that the regimen employed should in a few days, a week or so, during which readjustments can be made, afford complete relief of the major symptoms and that thereafter these symptoms should not recur without adequate explanation.

In my own experience I have never seen a peptic ulcer with any history of chronicity, or previous attacks, yield to any method of treatment that did not include a more or less complete neutralization of the acid-eroding mixture which forms in the stomach after food, either by alkalis or by the aid of a gastro-enterostomy and the protection of the ulcer-bearing area in this way for many months.

Undoubtedly, the control of the mechanical factors are of the greatest importance, particularly that of spasm, and other therapy besides alkalization should be directed to that end with especial reference to nervous tension and mental unrest.

COMMON ERRORS IN TECHNIQUE OF MEDICAL MANAGEMENT

This paper is not intended to be an exposition of medical management of peptic ulcer, but to point out wherein failure commonly occurs in the successful carrying out of a regimen such as that given above.

Alkalinization occupies a place of prominence in most treatments and, to my mind, it is most essential. It should be so regulated that, combined with rest and diet, absolute relief of symptoms of distress should follow speedily.

CHOICE OF ALKALINE POWDER

To accomplish this, the kind and quantity of alkaline powder used must vary with the patient, and we must keep constantly in mind our knowledge of the effects of the various alkalis, constitutionally and locally, on the gastro-intestinal tract. Soda bicarbonate, magnesium oxid, calcium carbonate, bismuth subcarbonate and subnitrate, and tertiary calcium phosphate and tertiary magnesium have proved the most useful. The first three, in various combinations, are most often employed. But our patients react quite differently to these. Magnesia may quickly produce a colitis with complicating symptoms of bowel distress, and the quantity should be varied to produce only one or two bowel movements daily. Calcium carbonate renders the stools bulky, and in many instances the dejecta are passed as hard, irritating balls, or rectal impactions ensue. This tendency varies with different individuals, and therefore the quantity given must be regulated by the reaction. Bismuth may act in a somewhat similar manner, and it may obstinately constipate many people. Therefore, as we observe the patient, distress symptoms must be segregated into ulcer distress, uncontrolled, and bowel disturbance that calls for proper variations in the formula of our alkaline powders. I have had many patients ready to stop medical treatment after alkalization on account of abdominal distress due to a deranged colon, which they ascribed to their ulcer, when the actual ulcer symptoms were absolutely gone. Of course, the elimination of these problems requires time, patience and perseverance, and a careful analysis of the day to day distress and symptoms.

TIME OF ADMINISTRATION

This analysis will also bring out any period of the day in which a constantly recurring distress symptom of pain, gnawing, or gas collection occurs which, if consistently repeated, is of great significance. Variations of intermediate feedings (such as milk and cream) and an increase in the amount of alkalinization just before the period of onset of distress is then indicated. This constant study is very necessary at first, and we should not be satisfied until we have secured general abdominal comfort. Occasionally the tube should be passed at different times in the day, with the patient on his regular regimen, and the sufficiency of neutralization determined.

INTOLERANCE TO ALKALINE POWDER

Besides the really serious cases of alkalosis, which may occur in certain arteriosclerotic or nephritic individuals, there frequently are found cases of more or less mild intolerance to the various more soluble alkalis. These people say the powders "make them sick" and complain of headache, distaste for milk, subjective numbness and tingling of the hands and feet, aching of the muscles and general nervousness. Urine and blood nitrogen studies should be made in such cases, and if necessary the tertiary calcium phosphate or tertiary magnesium should be employed. In many of these cases the intolerance to alkalis is only temporary. These symptoms generally appear in the first two weeks or not at all, except in the arteriorenal cases. Regular urine and blood pressure readings should be made from time to time on all cases under treatment.

In analyzing the past treatment of the patients whom we found necessary to send to surgery in the University Hospital, many of whom labeled themselves as medical failures, I found almost invariably this careful analysis of the day to day distress and regulation of the alkalization accordingly, entirely lacking. Furthermore, the handling of their night periods was generally entirely inadequate. Probably in most of these patients the free hydrochloric acid had been allowed to remain in the stomach in appreciable quantities, and therefore the ulcer would not heal.

All too frequently careful questioning elicited the fact that after a month or two of treatment with consequent relief, the plan was stopped, to be resumed when the symptoms returned and discontinued when the symptoms left.

DISCUSSION OF PLAN IN TREATMENT

Night Rest.—It is conceded that if we could starve our patients long enough, without serious constitutional results, most peptic ulcers would heal without further treatment. Since this is impracticable, we should seize the opportunity of giving as much rest as possible to the stomach at night. The longer we can keep it empty the better. Yet how infrequently this is done. Patients are given milk or a small meal before going to bed,

and on awakening in the night they take milk or crackers again.

Of course, we are aware that the Sippy treatment calls for emptying the stomach every night before retiring. The hospital cases and patients facing an alternative of lavage or an operation accede to this willingly enough for a while, but the average ambulatory case, frequently a high-strung business man or society woman, will not carry out such a procedure unless compelled to do so by fear or increasing distress.

And yet we desire to insure stomach emptying with a more or less neutral food mixture. It therefore seems irrational to prescribe night feedings. Instead the last meal should be taken as early as possible, and if possible it should be the lightest meal. Following this, sufficient alkalization should be instituted to keep the patient absolutely symptom free in the night.

All food after the evening meal should be forbidden, even milk. If there is night distress an additional powder should be prescribed. If this night distress persists, then lavage must be insisted upon and kept up regularly. This plan should be carried out regularly, without compromise, in cases with much residue or night hypersecretion with consequent pain, and the stomach should be left empty, or with a weak alkaline, belladonna solution in it. If an excessive night secretion is present, the stomach should again be washed out at midnight, preceded by sufficient alkalization.

Frequently, ambulatory cases that have been symptom free backslide, due to home or business disturbances, and no variation in powders or diet will suffice to secure control. A strict regimen in a hospital, with nightly lavage, for two to three weeks (later continued at home) generally overcomes the difficulties. Several times a fluoroscopic study, made at the beginning of this period, showed considerable six-hour retention and an apparently hopeless situation for medical treatment which, when repeated, two or three weeks later showed no residue and very little deformity, with the patient absolutely symptom free.

INITIAL HOSPITALIZATION

In beginning treatment, hospitalization is best, as it affords an environmental change, complete rest, and better means of securing control and teaching management. It also saves time in observation. In active ulcer cases with much distress or certain complications, no other alternative should be permitted. However, there are some cases who psychologically react badly to hospitals, and others, upon whom the financial burden falls too heavily who may be efficiently treated at home in bed.

Whether we like it or not, a number of our patients remain ambulatory from the start and most of them do quite well. They are the milder cases, of course, with an annoying recurring dyspepsia, seen frequently in active business men. Occult blood is usually not present in their stools. Curtailment of their activities, longer hours in

bed at night, week-end rests, combined with the general plan described above, is in most cases sufficient.

DIET

The diet has been too frequently discussed and outlined in the various weeks and stages of treatment to warrant particular comment here. In general, the meals should be small and simple with relatively few food selections for any one meal, and these should be foods that leave the stomach quickly, such as carbohydrates, vegetable purees, and foods which have the power of entering into immediate combination with the hydrochloric acid, thus producing a neutralizing effect. Milk, 20 per cent cream, and eggs are especially potent in this respect. Minced and ground meats are generally well tolerated. Meat extracts should not be allowed. Where milk is incompatible I have found orange juice and egg albumen useful. Finally, any bland diet, such as the smooth diet of Alvarez, may be followed. As a rule the evening meal should be light to promote the night fast. Our failures have not been attributable so much to wrong diet as to other factors of management.

MEDICATION

The chief drugs used are atropin and belladonna, and the various alkalis, including bismuth. Recently adrenalin and luminal in small doses, combined with belladonna, has been extremely useful in certain nervous cases with mental unrest, insomnia, and a generally hypertonic sympathetic nervous system.

ELIMINATION OF ULCER SYMPTOMS

Finally, to avoid failure, we should see our patient often enough and analyze his symptoms carefully enough to make sure that all ulcer distress and irritation have disappeared. If not, our regimen must be altered to accomplish this; whether it means different feedings, increased alkalization, removal of nervous factors, bed rest, or stomach lavage.

If we permit a five o'clock distress to recur regularly, no matter how apparently trivial, or a night disturbance to be handled as the patient sees fit, undoubtedly insidious progression is occurring in the ulcer and failure is imminent. We must establish abdominal comfort as our criterion of success.

REMOVAL OF CONTRIBUTING ETIOLOGICAL INFLUENCES

When the regimen is well established and the symptoms are under control, any probable etiological influences should be removed.

Root infections in teeth, pyorrhea, and other forms of gingivitis should be eradicated. Questionable tonsils should be removed and sinus infections should be treated. I have been rather skeptical of the advantage to be obtained by appendectomy, unless a very definite infection could be proved, and then have been in favor of removing the appendix more because it was potentially dangerous than for any effect it might have on the ulcer.

Frequently, in the course of our study of an ulcer case, we unearth a quiescent gall bladder with one or more stones. I have two or three such cases now, with definite ulcers, two duodenal and one gastric, completely free of all digestive symptoms, yet with definitely diseased gall bladders, without any clinical signs. I suppose that ultimately they should be removed *per se*, but as to their relationship to the ulcer, I am in doubt.

Prostatic infections should be treated properly.

In pelvic inflammatory disease in women, associated with a peptic ulcer, again the question arises, as in appendix and gall-bladder involvements, whether we should proceed more radically with surgery than we would if the local condition alone were found. Concrete evidence of the influence of these conditions on peptic ulcer is hard to obtain, but the possibilities are intriguing.

Along the same line we must do our best with any constitutional diseases, such as diabetes, nephritis, syphilis, and any deficiency states, but for this we may be thankful that comparatively few of our ulcer cases include any such complications.

On the other hand, I have come to believe that the nervous system exerts a profound influence both as a causative and exacerbating factor in the pathology of ulcer. So-called pylorospasm and hyperacidity without a demonstrable lesion is frequently seen, and while many of these cases may be due to a latent adjacent gall-bladder disease or to other abdominal pathology, or even to a non-visible mucous membrane erosion of the peptic area, by far the greater number must be put down as functional disturbances. What of their future if uncontrolled? Does ulcer later develop in any of these?

While exact proof has been lacking, I have certainly seen active, recent ulcers come to light in individuals previously free of any especial dyspeptic symptoms, following unusual mental stress and strain, during which period there had been excessive keying up of the whole nervous system: hurry, worry and fatigue, without any appreciable time for relaxation or let-down. In most of these cases, meals have been bolted or not taken, and, as they describe it, "the stomach has been tight and knotted up." High pressure business and professional men, women active socially or in the business world, are the functional sufferers, and perhaps the potential developers of peptic ulcer. Excessive contractions and spasm of the upper gastro-intestinal tract, with deep waves and pylorospasm and increased secretion, can be readily demonstrated by the fluoroscope, without deformity of outline. The duodenal syndrome, to a degree, is present; why not later the ulcer?

The shock of an accident frequently leaves this disturbance in its wake. In the past year I have seen four or five industrial accident cases with the above findings: spasm, hyperacidity, and an almost perfect ulcer symptomatology, but without demonstrable deformity, clearly on a nervous tension basis. On the other hand, I can recall the

discovery of duodenal ulcers for the first time, after unusually protracted mental and nervous strain, in patients of long acquaintance, but who had never previously complained of digestive disorders.

Perhaps the ulcer diathesis was latent in these individuals and needed but a nervous disturbance to bring it forth.

At any rate, many of our milder, ambulatory cases could very well emanate in this manner, and certainly when once established, an ulcer may be definitely exacerbated by these factors of nervous irritation and strain.

Therefore, not only in the prophylaxis, but in the therapy of ulcer must we reckon with nervous influences. Many failures in the cure result because we do not properly understand or influence the psychology of such individuals. The business and home environment, daily contacts, the mental unrest and fears, the continual drive without sufficient relaxation, as well as habits of eating and sleeping, need our attention, and radical alterations in the manner of living should be brought about if indicated.

We have previously given atropin and belladonna for local spasm, but, in addition, I have found small, regular doses of luminal of great assistance in this type of case; or in some cases, bromural, and often a mild hypnotic at night.

EDUCATION OF PATIENT

Finally, I believe it is essential to educate the patient with peptic ulcer as to the nature of his disorder, its intrinsic chronicity, tendency to insidious exacerbation, and even recurrence after two or three years of freedom. This teaching should go on, as in tuberculosis or diabetes, until the patient has the viewpoint of the physician and understands how to combat his problems.

To do this requires periods of explanation. Most patients start with the idea that it is as simple to cut out an ulcer as it is to cut out an appendix, or, if not surgically inclined, they will invariably slip away and drop their regimen with the first remission of symptoms, unless they have been taught that a recurrence is sure to follow if they do. Facts that are self-evident to us must be meticulously conveyed to the patient. The importance of regular contact with his physician for at least a year must be made clear. Without desiring to produce a hypochondriac, we are desirous to develop some self-analysis of the patient's digestive feelings, to teach him what they may mean, how to act, or when to seek advice. Reassurance, dissipation of cancer phobias, and an insight into future possibilities are essential. Unless we can give him, early, a pretty general knowledge of his problems and our own aims, he will leave his physician with his first reaction of distaste to the whole treatment, and he may do it anyhow.

I have found it useful to supplement these verbal instructions with a typed list embodying

the above principles, a summary of technique and time to be spent in carrying out a medical plan, and very definite rules for his future guidance after his present ulcer has healed.

384 Post Street.

DISCUSSION

FREDERICK A. SPEIK, M. D. (427 West Fifth Street, Los Angeles).—Although gastric and duodenal ulcers heal under proper medical treatment, we must be constantly on the alert for associated pathology. Intelligent observation, with frequent x-ray examinations, shows that the biggest and deepest ulcers gradually get smaller until they disappear, and the patient is symptom free. However, many cases in which lesions of the portal lymphatic system exist may have a return of symptoms or a recurrence of ulcer, because these lesions may be foci of infection in the gall bladder or appendix.

Sippy stated that, in order to treat peptic ulcer intelligently, it is necessary to determine the age, the type, the location and complication of ulcer. It is necessary to go further and determine if there are any lesions of the portal system, such as cholecystitis, appendicitis, pancreatitis, hepatitis, or peritoneal adhesions.

The taking out of an acute or chronic appendix does not cure the ulcer; note the number of cases in the table below who had an appendectomy before an ulcer was discovered. This is one reason why patients do not always get well following an appendectomy. There is pathology elsewhere.

Patients with foci of infection in the portal lymphatic system should have them removed at earliest recognition. If physicians are on the alert for associated ulcer pathology, the diagnosis will be made more promptly, and better end-results will be had.

The lymphatic drainage of the stomach, liver, pancreas, and appendix are anatomically closely connected.

In 60 per cent of cases reported above, gastric duodenal ulcer had associated pathology in the liver, the pancreas, the gall bladder, and the appendix.

Healed ulcer will not leave the patient symptom free unless the associated pathology is eradicated.

In a review of 156 cases treated in the last twenty-one months, the records show:

Appendix removed prior to diagnosis of ulcer.....	35
Chronic appendix diagnosed during management.....	28
Appendix out during management.....	8
Appendix out following treatment.....	6
Gall bladder removed prior to diagnosis of ulcer....	6
Gall bladder diagnosed chronic during management	26
Gall bladder out during management.....	2
Gall bladder with stones.....	3

114

That is, 114 cases out of 156 cases showing associated pathological conditions.

✱

HENRY SNURE, M. D. (1501 South Figueroa Street, Los Angeles).—The causes of failure in medical management of peptic ulcer are as interesting to the roentgenologist as to the internist. It is not unusual to re-ray the same patient at yearly intervals, and for a different referring physician or surgeon each time, any one of the latter having a high percentage of success in the management of ulcer. These cases seem to fall largely in the class of nervous, high-strung patients who cannot be controlled, patients who are otherwise intelligent and have sufficient means to carry out any type of treatment suggested.

It would seem the failures due to oversight of associated lesions, as brought out by both Doctor Kruse

and Doctor Speik, is gradually being diminished, particularly since fluoroscopic examination has been supplemented by careful study with a series of films which often show biliary and urinary calculi, hydro-nephrosis, focal infections in distant organs, etc. At the February meeting of the College of Physicians, Doctor Alvarez brought out in his paper on "Gastro-Intestinal Troubles That Now Go Undiagnosed" just how difficult this is. Out of five hundred consecutive cases with gastro-intestinal symptoms it was shown by extensive tests, operations, and postmortem findings that only forty-two had duodenal ulcer and six gastric ulcer, yet if the textbooks on the subject are to be believed, more of them should have been ulcers.

The roentgen ray also gives one a very good idea of the mechanical result of surgical interference. It is surprising how a new opening in the stomach wall that appeared to be larger than necessary at time of operation can close up or refuse to function; at times a roentgen-ray examination of a second operation may not reveal the cause of this failure to function. Repeated roentgen-ray examinations, as suggested by Doctor Speik, to note progress of treatment are important.

As a roentgenologist, looking at the matter from the side lines, it would seem that Doctor Kruse's requirement of rigid adherence to medical management as outlined in his paper promises the greatest measure of success.

✱

ROLAND CUMMINGS, M. D. (523 West Sixth Street, Los Angeles).—The almost universal error in treating peptic ulcer is the lack of time taken to produce the cure. This disease is an ulceration of an organ that cannot be put at rest. Tuberculosis is the ulceration of an organ that cannot be put at rest. Tuberculosis was not properly treated until physicians learned that the patient must continue his cure for two years after all symptoms and active signs had disappeared.

The same condition applies to peptic ulcer. Unless the patient continues his cure six to eighteen months after being symptom free, there will be a recurrence. The length of time to continue the cure depends upon the extent of ulceration.

There are many different diets recommended, but they have two common factors: (1) Lessening of acidity. (2) Rapid emptying of the stomach.

Most diets are accompanied by frequent feedings, which prevent so much pylorospasm.

There is much discussion about the use of alkalis, many physicians believing they have little if any part in the treatment of ulcer. I would feel quite lost without them, but have been able to theorize only as to their effects. I am impressed that they lessen the emptying time of the stomach as well as neutralize acid. The following prescription has served me best:

Rx: Bismuthi subnitrat
Magnesii usta et levis, aa 1 oz.
Sodii bicarb., 4 oz.
Sig. 1 dram six times daily in water.

Inasmuch as constipation is fatal to the cure of ulcer, this prescription is especially good, as the magnesia keeps the bowels free, the amount being adjusted to meet the need. I am impressed that there is something more in these alkali that assist in a cure than merely neutralization of acids and hastened emptying time, as I have seen definite benefit where acidity was very low. What this beneficial factor is, I cannot say.

The treatment of uncomplicated duodenal ulcer is very simple and should never require surgery. With gastric ulcer there is a very different story. Excision of the ulcer should be resorted to if it is at all deep.

THE KIDNEY FUNCTION IN PEMPHIGUS*

By SAMUEL AYRES, JR., M. D.
Los Angeles

A REVIEW of case histories of patients suffering with pemphigus, as recorded in hospital files and in medical literature, impresses one with the incompleteness of the observations. As a rule the histories are vague and the physical examinations are all too brief. Laboratory records usually include routine urine and blood examinations, occasionally bacteriological studies of the blebs and of the blood, and some blood chemistry studies. In view of the deep obscurity surrounding the etiology of this disease, together with its usual fatal termination, it is surprising that more complete statistical findings have not been recorded.

Six years ago the author had under his care a patient with pemphigus who began to develop edema of the ankles and albumin in the urine while receiving injections of neoarsphenamin. A renal function test showed an output of only five per cent phenolsulphonephthalein in two hours. Since then five additional cases of pemphigus have been observed in all of whom the 'phthalein output has been low. No mention is made of kidney function determinations in any of the available dermatological texts and a perusal of the literature and of local hospital records has been almost equally disappointing.

McCaskey¹ reported a case of pemphigus vulgaris which he believed to be due to renal insufficiency in whom the 'phthalein output was 37 per cent and 38 per cent in two hours on two separate tests. Grindon² records a 'phthalein output of 47 per cent in two hours in one of his cases under tryparsamid therapy. In both of these cases the dye was presumably injected subcutaneously.

According to Max Kahn and Morris Kahn in Tice's "Practice of Medicine,"³ the excretion of phenolsulphonephthalein in normal individuals, when injected subcutaneously or intramuscularly, varies between 38 and 60 per cent at the end of the first hour, and 60 to 85 per cent at the end of two hours. When injected intravenously, 35 to 45 per cent of the dye is excreted in the first fifteen minutes, 50 to 65 per cent in the first half hour, and 63 to 80 per cent by the end of the first hour. According to these authors, it is immaterial, as far as the excretion of the drug is concerned, whether the urinary output is 50, 200, 400, or 500 cubic centimeters. The excretion of the dye is diminished or delayed in acute or chronic nephritis in proportion to the severity of the renal impairment.

TABULATION FROM EIGHT CASES

The following table illustrates the essential facts in regard to the 'phthalein output, the urinary findings and the blood chemistry in eight cases of pemphigus vulgaris of the acute or sub-

acute type. Of these patients two left the hospital while still suffering from pemphigus and their subsequent histories are unknown; one (Grindon's case) died of lobar pneumonia during a period of relative quiescence in her pemphigus; four died of pemphigus, and one case is still under observation but is critically ill. Four of these patients received three to six injections of tryparsamid, one to two grams each, with rapidly fatal terminations, the one under observation at the present has gone downhill rapidly under tryparsamid, with a steady decrease in kidney function; one patient (Grindon's) improved under ten doses of tryparsamid, only to relapse; one patient (McCaskey's) was given arsenic, but the method of administration was not specified; one patient was given four doses of neoarsphenamin 0.45 to 0.9 gram, four doses of iron cacodylate five cubic centimeters (one grain) each, and eighteen doses of coagulen, with a fatal termination; one patient developed a transitory arsenical rash after a single dose of 0.6 gram neoarsphenamin.

From an examination of the chart it is clear that in these eight cases of pemphigus in which the kidney function was tested there was a consistent diminution in the output of phenolsulphonephthalein. The fact that the output was disproportionately low when the dye was given subcutaneously would suggest that the failure lay not only in the secreting power of the kidneys but also in the inability of the subcutaneous tissues to absorb the dye properly. The fact that in Case 8 the renal function steadily declined during the course of the disease, would suggest that the low 'phthalein output was a result of the disease or possibly a result of the treatment of the disease, rather than a cause of the disease. Another alternative would be the possibility that the low renal function and the cutaneous symptom complex known as pemphigus are both the result of some other causal factor such as an infection of the teeth or gums, or some other region.

For some reason, possibly merited, arsenic has attained some reputation in the treatment of pemphigus, although the author has yet to see a single case in which a permanent cure was established. Of the cases reported above, two gave a definite history of a preceding attack which cleared up under medical attention. Case 5 had an attack of "blisters on the abdomen and back" one year previously which cleared up in about four weeks under light treatments. Case 7 had an attack two years previously which lasted about six months and finally healed, although the exact nature of the treatment could not be determined. Yet both of these patients during their second attacks became rapidly worse under weekly injections of tryparsamid (four doses in one case and six in the other, of one to two grams each) and died in spite of all efforts.

In view of the marked impairment of the kidney function in these cases, one might legitimately ask if the arsenic may not do more harm than

* Chairman's address, Dermatology and Syphilology Section of the California Medical Association at the fifty-ninth annual session, Del Monte, April 28 to May 1, 1930.

TABLE 1.—Summary of Renal Function, Urine Examination and Blood Chemistry in Eight Cases of Pemphigus Vulgaris

Case	PTHALEIN EXCRETION										URINE							BLOOD CHEMISTRY						
	Date	Subcutaneous		Intravenous		Date	Reaction	Specific Gravity	Albumin	Sugar	Acetone+Diabetic	Casts	Miscellaneous	Date	Nonprotein Nitrogen	Creatinine	Uric Acid	Sugar	Chlorids					
		One hour	Total Two hours	Half hour	Total One hour																			
1 (McC.) Age 39	Not Stated	.....	37%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	540
		.....	38%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2 (G.) Age 40	.....	25%	47%	.....	.....	.....	.....	Negative	.....	.....	.....	.....	.....	.....	Normal	.....	.....	Normal	.....				
		.....	5%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3 (B. F.) Age 40	July 24	.....	5%	.....	.....	.....	.....	+	0	+	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	.....	.....	.....	.....	.....	0	0	0	.....	R. B. C. W. B. C.	.....	.....	.....	.....	.....	.....
4 (E. S.) Age 40	March 24	0	35.7%	.....	.....	.....	.....	++	0	0	.....	.....	occ. W. B. C.	Mar. 25	32	.....	.....	.....	.....	
		.....	35%	.....	.....	.....	.....	.....	0	0	0	.....	.....	Nov. 22	29	1.3	.....	118	.....				
5 (F.) Age 45+	Dec. 12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	30%	45%	.....	.....	.....	0	0	0	0	W. B. C.	Jan. 24	36	1.4	.....	.....	.....		
6 (V.) Age 50+	Feb. 13	.....	.....	5%	55%	.....	.....	0	0	.....	.....	.....	occ. W. B. C.	Feb. 13	52	1.6	.....	133	.....				
		.....	.....	.....	.....	.....	.....	.....	+	+	.....	+	W. B. C.	Feb. 13	.....	.....	.....	.....	.....
7 (F. C.) Age 35+	Nov. 14	.....	.....	25%	45%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	28% (Dec. 12)	38%	52%	.....	.....	.....	++++	0	+0	+	B. W. C. Mucous	Dec. 10	.....	.....	.....	114	446
8 (A.) Age 40+	Mar. 24	.....	.....	75%	92%	.....	.....	+++	0	0	.....	.....	W. B. C.	Mar. 30	26	1.3	2.3	100	.....				
	Mar. 27	60%	67.5%	35%	60%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mar. 28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95	.....				
	April 16	10%	20%	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	460
																			590					
																			(Fluid from blebs.)					

(Fluid from blebs.)

good. Surely one would hesitate in pushing arsenic or mercury in a syphilitic patient who showed a 'phthalein output of only 20 or 30 per cent.

In regard to the urine and blood chemistry examinations, it will be seen that evidences of kidney impairment are not so well marked. According to Hawk⁴ the creatinin normally present in the blood varies between one and two milligrams per 100 cubic centimeters. All of the patients in whom creatinin determinations were made were within normal limits. Nonprotein nitrogen values above 30 milligrams per 100 cubic centimeters are considered pathological; three patients in whom this test was made gave abnormally high figures and two were at the upper limit of normal. The blood sugar was moderately elevated in two patients out of six tested, which finding might be due to impaired renal function. In three patients in whom the blood chlorides were tested, the values were low, the normal being about 650 milligrams per 100 cubic centimeters. This would suggest a possible retention of the chlorids in the tissues, especially in the case of McCaskey's patient, who had been fed thirty grams of NaCl during the preceding three days. Urbach⁵ has reported an instance of sodium chlorid retention with decreased chlorid output in the urine. The chlorid metabolism in pemphigus might justify further study. In Case 8 the chlorid content of the blebs was 130 milligrams per 100 cubic centimeters more than the chlorid content of the blood.

Another interesting phase of the pemphigus problem is the question of liver involvement. Case 5 gave a history of chronic gall-bladder trouble for eight years preceding the onset of pemphigus, with frequent attacks of dizziness, vomiting and pain in the right side; this was confirmed roentgenologically. Case 7, after detailed questioning, admitted previous gastro-intestinal upsets with an attack of jaundice several years ago. Another patient, Mrs. R. F. (White Memorial Hospital, No. 5102), not reported in this series because kidney studies were not made, revealed at autopsy a liver with large rounded margins showing marked fatty degeneration. The gall bladder was negative and the kidneys showed cloudy swelling. This patient had entered the hospital for gastro-intestinal study nine months previously; sores in the mouth had just recently appeared at this time. There had been a history of epigastric distress and vomiting, together with constipation, over a period of fifteen years. A diagnosis of chronic gastritis was made. Mr. B. T. (Los Angeles General Hospital, No. 12364), with no entries in the history indicating gastro-intestinal pathology, showed at autopsy "slight diffuse fatty infiltration" of the liver and a gall stone measuring 1.5 by 1 centimeter. The other organs were reported as negative. Mr. P. F. C. (Los Angeles General Hospital, No. 2110114) had developed pemphigus one month prior to entry, had had edema of the ankles for two months, and had been constipated for many years; he had had malaria in his youth. The pemphigus

pursued a rapidly fatal course in spite of injections of iron and arsenic. Autopsy revealed "marked fatty changes" in the liver which had a nutmeg appearance, also chronic diffuse nephritis.

COMMENT

It is hoped that these few random remarks will serve as a stimulus to a more detailed study of the most serious disease with which the dermatologist comes in contact. The fact that the disease is relatively uncommon makes it all the more imperative that all possible information be assembled in each individual case, for it is only by such means that a rational therapy will be developed. Foci of infection, not only of the teeth, but also of the sinuses, tonsils, gall bladder, prostate, etc., deserve more consideration. A more rigid examination of the bacterial flora found in the frequently diseased gums and the teeth of pemphigus patients might yield some valuable clues as to etiology. The possibility that the cutaneous manifestations and the damaged kidneys of pemphigus are merely the toxic effects of relatively common mouth bacteria, such as streptococci or Vincent's organisms, is worthy of further study.

TREATMENT

In the matter of treatment, several points which would appear obvious in other conditions are often neglected in pemphigus.

1. Eradicate if possible all foci of infection.
2. Treat infection wherever found with measures as specific as it is possible to obtain.
3. Remember that pemphigus lesions involving large areas of the body surface are comparable to extensive burns with considerable fluid loss by exudation and should be treated along similar lines by copious fluid intake (intravenous, hypodermically, or rectally where swallowing is difficult) and sedatives sufficient to prevent undue nerve shock from pain. Also adequate warmth should be maintained.
4. A careful study of the kidney function should be made and no drug should be administered to patients in which the kidneys are already badly damaged.

SUMMARY

1. Eight cases of pemphigus are presented in which kidney function tests were made.
2. One hundred per cent of these eight cases showed decreased excretion of phenosulphonephthalein. The 'phthalein output was proportionally lower when administered subcutaneously, as compared with the intravenous route.
3. One case which showed a normal kidney function early in the disease displayed a steady decline in 'phthalein output as the disease advanced.
4. Five cases of pemphigus are cited in which the clinical history or the autopsy examination revealed pathology in the liver or gall bladder.
5. Therapeutic suggestions are offered among which the administration of arsenic is to be used with the greatest caution if at all in cases of pemphigus showing a low 'phthalein output.

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INTRAORAL CANCER AND ITS TREATMENT*

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AND

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DISCUSSION by H. J. Ullmann, M. D., Santa Barbara;
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ONE of the most difficult problems with which the physician is confronted is the recognition and treatment of intraoral cancer. In such an accessible place as the mouth, where lesions can be easily seen and felt, it seems that their recognition, especially their early recognition, would be relatively easy; but such is not the case. Too frequently the patient fails to consult anyone until he has already reached a hopeless state. Occasionally, however, he does consult a medical adviser who fails to realize the seriousness of the disease from which he suffers. Clinically this recognition is difficult, for the mouth is the seat of many pyogenic and pathologic processes which usually complicate the cancerous disease. This very complication is in itself of serious import, for it brings about earlier extension through the dilated lymphatics into the regional lymph nodes.

Although we are at sea as to any specific cause of cancer, we believe that susceptibility and irritation play a very decided part. The history of most patients suggests that some degree of trauma, mild in nature, is often the precipitating cause. Jagged, irregular and infected teeth are frequently found in apposition to the growth or to the ulcer. Now and then patients tell us that the first thing they remember is that they have on many occasions bitten themselves at the point of disease. Ill-fitting plates, which are too movable or too tight, have been the starting point of a growth on the gums. At first this irritation may manifest itself as a symptomless leucoplakia which gradually gets worse, until its very extent drives the victim to seek aid. Smoking is looked upon as an irritant in men, but whether this alone can be blamed is questionable. It will be interesting to observe whether the increasing number of women smokers will augment the incidence of cancer intraorally.

SYPHILIS AND INTRAORAL CANCER

Syphilis has been listed as a forerunner of cancer. In the Cancer Hospital at London the

statement is made that 93 per cent of all their tongue cases are associated with syphilis. Other observers do not give figures nearly as high, but this teaching is so universally accepted that many individuals are treated months and months for lues before malignancy is suspected. We all agree that syphilis should be definitely ruled out, preferably by history or by the Wassermann test, and if doubt still exists, by a therapeutic test. If the latter is chosen and the patient is treated intensively for three or four weeks without definite improvement, then we may be reasonably certain that syphilis is not the cause of the lesion. However, the question of syphilis is of greater importance as a complicating factor in prognosis. It has been our observation that all neoplastic conditions associated with syphilis are exceedingly malignant, and in the majority of patients the neoplasm runs its course to a fatal termination despite the type of treatment instituted. Most individuals falling in this class, whom we have observed, are hopeless when they apply for treatment. Ewing, whose wide experience leads him to speak with authority, says that when the physician is confronted with these diseases in symbiosis, he should treat the cancer to the exclusion of the lues. In other words, if the patient recovers from his cancer, he can be treated for lues later.

BIOPSY

Though most cases of intraoral malignancy are recognized clinically, especially in the advanced stages of the disease, the absolute diagnosis must rest on biopsy. The opinion of medical men seems to be divided on this point, some arguing that it leads to a dissemination of the disease; but others, such as Judd and Regaud, say that in the early, small lesion it is advisable to excise all or a portion to get a correct diagnosis so that the proper treatment may be instituted afterward. In the ulcerating case, which is already sloughing and in which small portions of tissue are constantly being broken off, there is little danger of dissemination attached to a biopsy; on the other hand, there is always a potential danger in the early lesion. If a specimen is absolutely necessary, its removal by the method that Morgan has described is safe. This consists of using the high frequency undampened bipolar current. The specimen cutter is a loop of wire which cuts and seals, and when it has reached the depth one wishes it is pulled back, extracting a piece of tissue sufficiently large for microscopic study.

METHODS IN DIFFERENT CLINICS

Relative to the methods of treating intraoral cancer, there has been and is a divergence of opinion. Originally all cases were treated surgically, and although there were many cures there were a great many failures. During the last few years some of the most brilliant minds, representing the surgical, pathologic and radiologic viewpoints, have presented their ideas, and to them we owe a debt, as the present trend is a crystallization of the opinions of many groups of workers rather than those of any one individual.

At the Mayo Clinic it is customary to excise

* Read before the Radiology Section of the California Medical Association at the fifty-eighth annual session, May 6-9, 1929.

the lesion if possible, and to give preoperative irradiation to the regional nodes, after which a block dissection is done. The gland-bearing areas are again thoroughly radiated, if the pathologist reports the presence of malignancy. In other centers it is customary to rely on radiation alone, or combined with electrocoagulation, to eradicate the disease. Thus, at the Memorial Hospital the original lesion is treated by radium implants. The gland-bearing areas receive irradiation from high voltage x-ray and radium, and then a block dissection is carried out. At the Curie Institute, Regaud follows the same technique but does a block dissection of the neck before irradiating the neck. At the Westminster Hospital in London, radium implants have replaced surgery of the tongue; while Harmer, at St. Bartholomew's, relies almost entirely on electrocoagulation, though at times he uses radium implants first and then follows by electrothermic surgery.

A glance at Table 1 will show that, with the exception of Judd and New, the leading observers are using radium element or radon implants for the primary lesion. There is considerable agreement on this. The statistics available to show the effect of treatment are not of long enough standing to give much accurate information, except those of Regaud (see Table 2), who has shown that in 43.8 per cent of all cancers of the tongue the local lesion is curable, but in only 23.8 per cent is there a complete cure, since 20

per cent of the patients, though cured locally, die of a secondary adenopathy.

INTRAORAL TREATMENT METHODS

In so small a space, as the mouth, where there is such a variety of structures in contact with varying degrees of sepsis, no one type of technique can be used in all cases. The technique which we have followed will be given according to location. We feel that it is essential to render certain preliminary treatment prior to instituting any active attack on the lesion. All forms of sepsis due to teeth must be eliminated by thorough dental cleansing and extraction. Likewise, plates must be permanently removed. Mild mouth washes give much relief. While this clean-up is being carried out, radiation in the form of high voltage x-ray or radium packs is given to the gland-bearing areas on each side of the neck. As a result of this preliminary treatment, enlarged glands which are frequently only the seat of septic absorption may disappear, while the original lesion in the mouth diminishes as the accompanying inflammatory zone shrinks.

When the primary lesion is on the tongue, it is attacked by circumvallation with implants of radon, filtered through gold or platinum. Whether one relies on implants which are permanent or removable apparently makes little difference, but if there seems to be much sepsis or if the lesion has been badly inflamed, the removable platinum point is used as there is less chance for abscess

TABLE 1.—Tongue Cancer Technique

Place	Primary Lesion	Secondaries if Operable	Secondaries Inoperable
Mayo Clinic. Judd & New	a. Operable: Excision with cautery. b. Inoperable: Surgical diathermy and insertion of radon im- plants.	a. Preoperative radiation. b. Block dissection. c. Postoperative radiation if glands show carcinoma. d. Grade (4) radiation only.	H. V. x-ray or radium pack.
Memorial Hospital Quick.	Implants radon gold filtered.	a. Glands not palpable: H. V. x-ray and radium pack. b. Glands palpable: H. V. x-ray and radium. Dissection neck and implants in wound.	a. H. V. x-ray and ra- dium pack b. Exposure of glands and insertion of im- plants.
Philadelphia General. Dorrance and Morgan	Implants radon gold filtered.	a. H. V. x-ray to saturation or radium pack—large amount—short time.	a. H. V. x-ray. b. Radium packs.
Curie Institute. Regaud	Implants radium needles platinum filter.	a. Block dissection (Crile) b. Radium collar—if glands show car- cinoma.	Radium collar — small amount of radium— platinum filter—over a long period.
Westminster Hospital, London. Cade	Implants radium needles platinum filter.	a. Block dissection (Crile) one month after primary. b. Radium collar—entire neck.	Radium collar — massive dose. 25,000 to 30,000 mgh.
Manchester Infirmary. Birkett	Implants radium needles platinum filter.	a. Movable glands: Block dissection and implants in wound.	Platinum filtered im- plants into fixed glands.
St. Bartholomew, London. Harmer	Implants* radium needles platinum filter plus endotherm excision.	a. Glands not palpable: Radium collar. b. Glands palpable: Dissection plus radium collar.	Radium collar or filtered implants.
Solland Clinic	Implants radon gold or plat- inum filtered.	a. H. V. x-ray or radium pack. b. Electrocoagulation of glands plus radium pack.	H. V. x-ray or radium pack.
Radiumhemmet	Electrocoagulation followed by radium needles. 1 millimeter lead filter.	a. Radium element pack. 3 millimeters lead filter—25 to 40,000 mgh.—plus gold and platinum im- plants.	(a) Same as operable.

TABLE 2.—Effect of Radium Implants on Local Tongue Lesions (Regaud) 1920-1928

Location of Lesion	Complete Cure	Local Cure Died of Adenopathy	Total Local Cure	Palliation Only
Anterodorsal	26.4%	24.8%	51.2%	48.8%
Postdorsal	19.5%	17.0%	36.5%	63.4%
Sublingual	22.0%	11.6%	33.6%	66.4%
Total tongue	23.8%	20.0%	43.8%	56.1%

formation resulting from the presence of a foreign body, such as took place in one of our cases. Following the general rule of using 2.5 millicuries per cubic centimeter of tissue, a reaction is set up that will destroy the malignant tissue without doing much damage to the normal structures. In case of doubt, it is better to overradiate rather than to underirradiate, since the chances for a good result are better from the primary application than from subsequent sessions. Birkett's work illustrates this point. When using the same technique, he found that 22.8 per cent of his patients were well in whom he left his needles less than seven days; while 40.8 per cent were well when he left them longer than seven days.

Pfahler and Berven recently described their results in treating these cases by large amounts of radium at a distance, filtered through the equivalent of 4 millimeters of lead, giving a total of 25 to 40 gram hours over the neck. This is supplemented by surface applications of radium, filtered through 3 millimeters of lead, applied over the local lesion. Under this regimen the immediate results have been remarkable, but the time elapsed since using this technique is too short to give a final report.

Lesions of the cheek may be treated by implants, but usually surface radiation, by gamma rays, will clear up the majority of the cases. If this is insufficient, we resort to electrocoagulation. Those involving the alveolar border and palate are treated with difficulty with implants, since the proximity of bony structures sets up a periostitis which is very annoying and painful. Here again surface applications may be better.

The tonsil is often the seat of malignancy. When a carcinoma is present, interstitial radiation, as used in the tongue, gives the best results but, if the lesion is a sarcoma or the transitional type of carcinoma described by Quick and Ewing, surface radiation gives excellent results. These lesions are extremely sensitive to radiation and disappear quickly.

Broders has shown that all malignancies are not equally sensitive to radiation. Those that fail to respond, and which are not completely eliminated, are treated by electrosurgery. Though the actual cautery has cured many cases, we feel that electrocoagulation offers a better chance. Where the cheek, alveolar border and palate is involved so that there is bony adherence, this method is of distinct advantage. It not only destroys the malig-

nant cell, but it eradicates the associated infection which makes for resistance to radiation therapy.

What to do with the regional glands is a moot question. Theoretically a block dissection, as carried out by Regaud, should be the choice of procedure, but the chances for cure after actual involvement of the glands is so small, and the mortality is so high because of the poor condition of the patients, that it is not practiced as often as formerly.

END RESULTS

Duffy's study at the Memorial Hospital has shown that, in 194 cases of carcinoma of the tongue, 60.3 per cent did not develop nodes at any time. In seventy-seven cases of cancer of the floor of the mouth and fifty-six cases of cancer of the tonsil, 70.1 per cent and 71.4 per cent respectively had no nodes at any time. Quick feels that if a routine dissection of the neck is carried out, many needless operations are the result, with no better chances for cure. For this reason he has adopted a conservative course in treating the neck by irradiation where no nodes are palpable, but if nodes are palpable and the case is operable, a block dissection is done after a thorough irradiation with both high voltage x-ray and radium packs. Whether this viewpoint is the correct one is hard to say, but it does seem that we are justified in not advising a block dissection until definite indications exist.

In our work, where we palpate one or two movable glands and when they have not disappeared under irradiation, it is our procedure to expose the gland, destroy it by coagulation in situ, and then to apply a radium pack. The drawback is that the resulting wound heals very slowly. However, our impression is that in the few patients in whom we have done this, the shock from the operation is small and the immediate results are favorable. On the other hand, if the glands are fixed, external irradiation alone is given with no attempt at surgical exposure.

The records of the Soiland Clinic show that 185 patients with intraoral cancer, exclusive of those with leukoplakia, have applied for treatment since 1922. In the majority of the cases the lesion was on the tongue and, of these, the males predominated four to one. Sixty-three of the patients were in a hopeless condition when they sought advice and treatment. During the early years the treatment was entirely surface radiation, with very little filter, so the caustic beta rays were used. This gave only palliative results. Then

TABLE 3.—Cervical Lymph Nodes—Mouth Cases (Duffy)

Lesion	Cases Admitted	No Node: Through-out	Percentage with no Nodes at any Time	Deaths in Cases with no Nodes but Died of Primary
Ca. Tongue	194	117	60.3	31.6%
Ca. Floor	77	54	70.1	31.5%
Ca. Tonsil	56	40	71.4	55.0%

came the use of filtered surface irradiation with a better outlook. When glass implants were introduced, our enthusiasm increased, and now that interstitial irradiation from gold and platinum seeds is used, we feel that the patients with this disease have a fair chance for recovery. At any rate the primary lesion practically always disappears. The prognosis of the case is dependent on the secondaries. Radiation when successful produces little deformity and does not interfere with function if the disease is not too extensive. Where radiation is not sufficient, especially in the radio-resistant lesion, electrocoagulation and electrosurgery may be used with good effect.

CONCLUSIONS

1. All cases of intraoral malignancy should be given the benefit of radiation therapy. In the advanced lesion it is always a good palliation, and in the early lesion it gives results on a par with more radical procedures.

2. Those patients who are operable and who have not shown sufficient response to irradiation should be cared for by electrosurgery.

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DISCUSSION

H. J. ULLMANN, M. D. (Cottage Hospital, Santa Barbara).—The authors have covered the subject so well that very little is left for discussion except to concur with their views. For those who are doing extensive cancer work Table 1 is of great interest, as it gives one a chance to compare technique at other centers with one's own methods. The intraoral cancers that we see at Santa Barbara are nearly all so far advanced that we can hope for little more than palliative results. There are two reasons for this, and this applies to the country at large as well as the Santa Barbara district. The first is the slowness of many patients to have an examination when they first detect symptoms in the mouth, and the other is the failure of the examining physician to recognize early cancer. I believe that at the present time it is as important to teach physicians to recognize early cancer as it is to educate the public to have early examinations.

✱

LAURENCE TAUSSIG, M. D. (384 Post Street, San Francisco).—This review of the present status of the treatment of intraoral malignancy is of distinct value. I believe that the pernicious belief in the danger of biopsy should be discarded. Properly done, the danger is negligible, while it may often be the means of saving life. In our clinic at the University of California we favor the implantation of gold seeds of radon for the primary lesion, followed in about two weeks by electrocoagulation. Meanwhile the cervical glands receive x-ray therapy and if palpable nodes are present, when the oral wound is about healed, a block dissection is done. In our experience, neoplasms of the soft palate and tonsil have responded better to treatment than those of the cheek and tongue. It is amazing the amount of palliation that patients with very extensive lesions sometimes obtain from conservative radiation. Overradiation is the pitfall to be avoided, for instead of a distinctly good palliative result the pain and misery may be greatly increased.

✱

LYELL C. KINNEY, M. D. (1831 Fourth Street, San Diego).—The authors' emphasis on biopsy is very important. The early localized lesion presents a good prognosis under prompt treatment, but too often the chance of cure is sacrificed by a few weeks of "watchful waiting" before a diagnosis is reached. This procrastination by the patient or his first adviser is

responsible for much of the fatality of intraoral carcinoma. The hope of increased success is not from further refinements of technique, but from early diagnosis and immediate destruction of the lesion. Every suspicious intraoral lesion should have a biopsy when it is first seen.

We wish to commend the treatment program outlined in the paper. The preliminary high voltage x-ray with careful attention to dental and oral sepsis we have found to greatly facilitate the radium treatment and to diminish the severity of the reaction.

The treatment of intraoral cancer and of the cervical glands is always a major surgical problem. The splendid review prepared by the authors shows that it is best handled by close cooperation between the surgeon and the radio'ogist.

✱

DOCTOR MELAND (Closing).—The paper and the able discussion emphasizes the fact that the treatment of intraoral cancer is in a transitory phase. No hard and fast rules can be laid down as to what shall be done in any case, but the general trend of opinion is toward interstitial radiation and electrosurgery. A common mistake that one makes is mentioned by Doctor Taussig, where we fail to distinguish between radical and conservative radiation in hopeless conditions. Overtreatment in a hopelessly advanced case with its pain and discomfort does more harm than good and must be continually guarded against.

Despite our educational efforts, too many hopeless cases are presenting themselves for treatment. The pessimistic attitude on the part of laymen and practitioners alike is partly to blame, but with increasing experience and better results, it is hoped that this may be overcome.

RADICAL TREATMENT OF CANCER OF THE BLADDER*

By ROBERT C. COFFEY, M. D.
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IT would be presumption on my part to attempt to enlighten an audience of urologists concerning the present-day status of any branch of urology. I take it that Young's monumental work, which has recently come out, represents the best that is known on the subject of cancer of the bladder. In this book he has reported 534 bladder tumors. Of these, seventy-two, or 13.5 per cent, are classed as benign papilloma, by which we may infer that no evidence of malignancy can be discovered microscopically. Ninety-six cases, or 18 per cent, are classified as malignant papilloma, meaning a papilloma having the appearance of a benign papilloma but containing unmistakable microscopic evidence of malignancy without infiltration of the bladder wall. Eighty-eight cases, or 16.5 per cent, are classified as papillary carcinoma, meaning a malignant papilloma which is infiltrating the wall of the bladder. Two hundred and fifty-six cases, or 47 per cent, are classified as infiltrating carcinoma, which means that the growth is infiltrating the bladder wall without definite papillomatous manifestations. Twenty-two tumors are not included in this classification. Thus, it will be seen that 81.5 per cent of bladder tumors are actually malignant when they come to Young's clinic for treatment.

*Read before the Urology Section of the California Medical Association at the fifty-eighth annual session at Coronado, May 6-9, 1929.

YOUNG'S TREATMENT CLASSIFICATION

Young has classified treatment under four heads: fulguration, radium, electrocautery, careful radical surgery. He estimates that the present-day curability of bladder tumors by the wise application of all these agencies would be about as follows: Benign papilloma, 95 per cent; malignant papilloma, 75 per cent; papillary carcinoma, 50 per cent; and infiltrating carcinoma, 25 per cent. Therefore, according to Young's figures, it may be assumed that 40 to 50 per cent of bladder tumors may be cured by present-day methods. I am not prepared to discuss intelligently the meaning or accuracy of these results and, therefore, will limit my remarks entirely to the other 50 to 60 per cent for which no cure exists today.

RADICAL TREATMENT

I think it is safe to say that there is but one more step to take and that is, radical treatment of cancer of the bladder. By the term, "radical treatment" is meant the eradication of cancer of the bladder with a ruthless disregard for the bladder as a future reservoir for urine. Before this step can be taken, it is necessary that we shall provide a workable substitute for the bladder. The rectum is the only practical substitute, as it is the only available hollow viscus controlled by an efficient sphincter muscle. To utilize the rectum for this purpose has been a very puzzling problem. While Gray's anatomy of thirty years ago, in giving the course of the ureter, says that it traverses the space between the muscular and mucous coats of the bladder for nearly an inch before it empties into the bladder, surgeons and experimenters failed to grasp the significance of this arrangement, for by this arrangement a perfect valve is produced, and without a valve it is impossible to transmit fluid from an area of low pressure to one of higher pressure. As a consequence, all methods of direct transplantation of the ureter into the bowel ended in disaster to the kidney and frequently to the patient.

VALVE ACTION FOR TRANSPLANTED URETERS

The practical application was discovered by accident in a set of experiments in which it was necessary to transplant the bile duct to a new location in the intestine. The fact that at a second operation the bile duct was dilated led to the discovery that there must be a difference in pressure in the intestine and in the duct. After transplanting the bile ducts by the method which nature has used in the implantation of all of the ducts, namely, to the space between the mucosa and muscularis, it was found that the bile duct did not dilate. This plan was then applied to the ureter with the result that in 1910 I was able to exhibit to the surgical section of the American Medical Association at St. Louis five undamaged dog's kidneys with undilated ureters. This was the first time that it had been possible for anyone to make such an exhibit before any society. Dr. Charles Mayo was chairman of the surgical section when the presentation was made and was the first to apply the method to the human being. Since that time, Doctor Mayo and Doctor Lower

of Cleveland have had a considerable number of cases in which transplantation of the ureters has been done, one ureter at a time. I have had a smaller number by this original technique. Nearly one hundred other cases have been reported by different doctors scattered throughout the country. The ultimate results in these cases indicate that transplantation of the ureter into the bowel by the submucous technique is a feasible operation. Unfortunately, this operation, when done without the use of the tubes, has made it necessary to transplant the two ureters at separate operations. Radical removal of the bladder is a very serious operation in itself. Thus, the ordeal of three major operations does not seem justifiable in a case of cancer of the bladder in which the outcome, at best, is not especially promising. After long experimentation in removing the obstacles and dangers of the operation, we are now able to transplant two ureters simultaneously with far less danger to the patient than we could transplant one ureter by the former method.

FACTORS UNDERLYING SURGICAL TECHNIQUE

The completed technique for bilateral transplantation of the ureters by the tube technique was given in *Surgery, Gynecology, and Obstetrics*, November, 1928. The fundamental principle of the original operation, which is valve action, must be retained in any successful operation for transplantation of the ureters. The fundamental point in the technique is that the ureter must be made to run immediately under the mucosa for a distance before it opens into the lumen of the bowel. There are two other important features to remember:

A. The kidneys are vital organs, and life can last only a short time without their function. Therefore the operation must be so arranged as to interrupt renal function as little as possible. To provide against the serious interruption of renal function during the days immediately after operation, three plans have been used:

1. Transplantation of one ureter at a time through separate incisions, the operations being from ten days to two weeks apart (C. H. Mayo).

2. Unilateral or bilateral transplantation of ureters preceded some time before by bilateral nephrostomy (Hinman).

3. The tube or catheter technique in which catheters of sufficient size are used to transfer the fluid through the operative field during convalescence.

By the first plan, two major abdominal operations are necessary. By the second plan, two loin incisions are made at one time, followed later by an abdominal operation. By the third plan, only one operation is required and only one abdominal incision. The third plan is, therefore, to be preferred when practical.

B. The next consideration is that the operation involves the opening of the peritoneal cavity and also the opening of the retroperitoneal space, in the presence of which the large intestine, or cecum of the body, must be opened. Infection emanating from the site of transplantation is

often fatal, and is always detrimental to the final result. Therefore every effort to sterilize the field and produce an aseptic operation should be made.

VITAL POINTS IN OPERATIVE PROCEDURE

The vital points of the operation are as follows:

1. A valve must be produced. This is done by running the ureter beneath the loose mucous membrane for a distance before it enters the intestinal lumen.

2. Flow from each kidney must be uninterrupted. This is accomplished by introducing large size ureteral catheters (No. 12 preferable) well up the ureter toward the kidney pelvis.

3. An anchorage for fastening the ureter to the catheter is made by slipping a snugly fitting segment of a rubber tube about three-quarter inch in length over the catheter. As the catheter is slipped into the ureter, the split end of the ureter is tied to the cuff by placing a linen thread around both.

4. Ascending infection along the lumen of the ureter is prevented:

(a) By placing a ligature tightly around the ureter above the point where the ureter is anchored.

(b) By causing the ends of the catheter to discharge in a bottle containing 1:1000 bichlorid solution.

5. The bowel is cleansed:

(a) By isolating the lower segment of the bowel with a rubber-covered stomach clamp.

(b) Irrigation of the isolated segment with sterile water from above through a No. 13 Lewishon needle attached to an irrigator followed by one per cent mercurochrome solution.

(c) By packing the rectum with dry gauze.

In this way the field is made relatively free from gross infection.

6. By holding the segment of the intestine in which the incision is to be made between four traction loops, the incision is made and the ureter implanted and held in place by sutures with a minimum of manipulation.

7. By drawing the external flap of parietal peritoneum across to the intestine and suturing it there over the intestinal incision in which is buried the ureter, a retroperitoneal space is formed. By draining this retroperitoneal space with wicks and quarantining the operative area by a rubber tissue wall, retroperitoneal infection and peritonitis has been practically eliminated.

RESULTS IN THIRTEEN CASES

I have now, within a little more than a year, performed the operation of bilateral transplantation of the ureters in thirteen cases without operative mortality and without demonstrable evidence of permanent injury to any one of the twenty-six kidneys. In one instance the ureter pulled out and left a urinary fistula, but there has been no evidence of damage to the kidney. Having solved this fundamental problem of ureteral transplantation, we may now return to the origi-

nal problem of radical treatment of cancer of the bladder.

COMMENTS ON SURGICAL AND RADIUM PROCEDURES

With the ureters delivering the urine into the rectum, the bladder becomes a useless organ which may be removed or destroyed without interfering in any way with the normal body functions. From the standpoint of treating carcinoma, such a bladder presents a striking analogy to the uterus in that we have a choice between radical removal by surgery or destructive doses of radium. Taking all cases of cancer of the cervix uteri, radium has become much more important than surgery. Impartial authorities believe that by comparing a hundred cases of operable cancer of the cervix treated by radical surgery with an equal number of similar cases treated by radium alone, there would be very little difference in the ultimate results. A great advantage on the side of radium, however, is that its application carries no mortality, while surgery carries a mortality of from 5 to 20 per cent. Furthermore, much more than 50 per cent of cases of carcinoma of the cervix coming to the surgeon are inoperable. A certain percentage of these inoperable cases may be cured by radium. A much larger per cent of such cases, when treated with radium, are relieved of a very offensive condition and made relatively comfortable, although not cured. These results are possible in the cervix, largely because radium may be applied directly in the center of the growth and used in destructive doses without seriously injuring surrounding organs. After the bladder has been abandoned as a reservoir for urine, the same principles will apply, with the added advantage that there are no adjacent vital organs which may be injured by destructive doses of radium. Therefore it is possible to use much larger doses of radium with impunity in such a bladder than in the uterus. This large dosage should bring better curative results.

TRIGONE SURGERY

Young states that approximately 75 per cent of all the tumors of the bladder are in the trigone or base. There are still other cases in the vesical neck, in the prostatic orifice, and in the immediately adjacent mucous membrane. Thus, probably 85 per cent of the tumors of the bladder are located in the relatively fixed portion of the bladder. This part of the bladder is the difficult part to remove. This is particularly true in the male in which some 80 per cent of all tumors of the bladder occur. On the other hand, this part of the bladder is most accessible for the application of massive doses of radium. Therefore it would seem that radical surgery is rarely justified for the treatment of this 85 per cent of cases in which tumors are located in the trigone, or base of the bladder, and the neck of the bladder. If a sufficient quantity of radium is not available, complete removal of the bladder can be performed by the technique of Albarrán which is so well described in Young's "Urology," but it will at once be seen that this is a very formidable operation, done by combined approach through the perineum and the

suprapubic space. Subtotal cystectomy in the male for carcinoma located in the movable contractile portion of the bladder should be ideal. In this way the remaining base of the bladder and the urethra could be treated, and even destroyed, with radium at the option of the operator, depending upon the case. Complete cystectomy in the female is by no means so difficult, and has been performed by me in one case following bilateral transplantation of the ureters with perfect results. However, for cancer of the base of the bladder in woman, even in operable cases, it may be possible that surgery may give no better results than destructive doses of radium, for in the female the base of the bladder may be treated through the anterior wall of the vagina as well as from the inside of the bladder. For cancer of the movable part of the bladder in the female, subtotal cystectomy, or even total cystectomy, should be the procedure of choice.

It must not be forgotten, however, that the application of radium requires just the same skill and knowledge of cancer as does the application of surgery if good results are to be obtained. Radium has not been successful in the treatment of cancer of the bladder for the reason that a destructive dose of radium so burns, destroys or distorts the bladder wall that it is no longer practical as a reservoir for urine. It is very important in the use of radium that it shall be placed exactly where it is to remain and that it must be held exactly in that place.

AUTHOR'S RADIUM PROCEDURES

Our plan of treatment of cancer of the bladder with radium is as follows:

One week after the transplantation of the ureters, the gauze wicks of the quarantine are removed. The large sheets of gutta-percha tissue are allowed to remain. Twelve days after the operation, two days before the ordinary time for the removal of the gutta percha, a catheter is inserted through the urethra, the bladder is distended with water, and the rubber tissue in the drainage wound is held upward. The end of a blunt Mayo scissors is pushed through the bladder wall, just above the pubes and spread until two fingers are admitted. The opening is further enlarged by stretching. Hemorrhage is much less than that following a clean-cut incision or cautery opening. The radium is screened and placed in the desired location and held in position by packing the bladder cavity with gauze. The radium is placed in different ways, according to the location of the growth. If the growth is small and is in the trigone, or base of the bladder, just back of the urethra, two 50 milligram tubes of radium carefully fitted over the growth and held in place for thirty-six hours should be sufficient. Each tube is screened with its brass container, one millimeter of lead and a covering of gauze which is made of the end of a folded gauze tape sponge. The gauze tape is left long to be used in drawing the radium out through the opening. The two tubes of radium thus screened are sewed together and then attached to the end of the catheter which

had been pushed through from below. Traction is now made from below on the catheter which draws the two tubes of screened radium down to near the urethral outlet. This is made taut by fastening the catheter to adhesive straps which bind the two thighs together. The bladder is now packed with gauze so as to firmly fix the radium directly over the growth. If the growth is quite extensive, two or three other tubes of radium are screened in a similar manner and arranged in different locations around the growth and held in position by the gauze packing which is made to fill the bladder entirely. The pain is relieved by ample doses of morphin. In this way as much as five or six thousand milligram hours of radium may be used in the bladder. Much more, if desired. This wound is left open and it communicates with the drainage sinus, so after the rubber tissue quarantine has been removed it is possible to make other applications of radium through this same wound. Time and experience must determine the relative importance of radium and surgery which may be made to include such destructive agencies as the cautery and electrocoagulation.

611 Lovejoy Street.

ROENTGEN DIAGNOSIS OF PULMONARY TUBERCULOSIS IN INFANTS AND CHILDREN*

By ROLLA G. KARSHNER, M. D.
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DISCUSSION by William H. Sargent, M. D., Oakland; Henry E. Stafford, M. D., Oakland; Lloyd B. Dickey, M. D., San Francisco.

THE following study is based on observations made at the Children's Hospital of Los Angeles on more than one hundred cases of pulmonary tuberculosis in infants and children which came to autopsy.

The conception of the disease processes which emphasizes the similarity in sequence of manifestations between tuberculosis and syphilis, each exhibiting a primary, secondary and late stage, is preferred. One then may outline the events which follow the entrance of the tubercle bacillus into the lung as follows. If the attack is massive the child is overcome by an acute caseous and rapidly fatal disease. If the invasion is mild, there results a primary lesion of small extent, situated anywhere in the lung, which usually goes on to cure by fibrosis or calcification. Coincident tuberculous adenopathy may remain latent or may manifest itself clinically some time after the primary focus has healed. Toward puberty, or more commonly in early adult life, late infection of the lungs may occur either from mobilization of tubercle bacilli in the bronchial nodes or by massive infection from without.

Pulmonary tuberculosis in infants and children may be classified according to the appearance and

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distribution of the infiltrations on the roentgenogram. The following classification covers our material at the Children's Hospital.

TABLE 1.—Classification

Roentgen Type	Stage of disease		
Primary Tuberculosis:			
Primary lesion.....	I		
Caseous pneumonia.....	I	II	
Glandular Tuberculosis:			
In infancy.....	II		
In childhood.....	II		
Hilum Tuberculosis:			
In infancy.....	I	II	
In childhood.....	II		
Recurrent pneumonia.....	II		
Basal distribution.....	I	II	III
Miliary Tuberculosis:			
Pulmonary.....	II	III	
Accompanying tuberculous meningitis.....	II	III	
Adult Tuberculosis	III		

PRIMARY TUBERCULOSIS

Focal Primary Lesion.—The initial lesion of tuberculosis is almost always undetected. Its small size renders its recognition by physical examination impossible and its symptoms are mistaken for those of the numerous respiratory or other infections. It is fortunate when such lesion is discovered while still active, for it usually heals rapidly. The roentgenogram will show a pneumonic infiltration of moderate extent which may occur in any lobe. It may be multiple. More frequently the healed remains of the primitive infiltration are detected, though in the greater number of cases it becomes invisible because of its size. Often it is represented only by a strand of fibrous tissue, generally in an upper lobe. Not infrequently the pleura in the region of the site of the initial lesion is involved, leaving a sharp linear shadow extending from hilum to periphery.

Caseous Pneumonia—Infantile Phthisis.—Before pathologic studies revealed the frequency of pulmonary infection in the early months of life, with increasing infection year by year, tuberculosis in infancy was regarded as almost invariably fatal. We now know that even in infancy an advanced tuberculous process may heal. The susceptibility, however, to massive infection is very great, and it may terminate in a most extensive caseous consolidation and necrosis of the lung. Whether this is the result of primary infection or is secondary cannot always be determined. Undoubtedly in some cases it results from rupture of a caseous lymph node into a bronchus. The process is usually rapidly fatal.

GLANDULAR TUBERCULOSIS

Tuberculosis of the Intrathoracic Lymph Nodes. In the diagnosis of this condition the roentgenogram is indispensable. The diseased lymph nodes, in all their variety of size, shape and position, are projected as dense shadows extending beyond the mediastinum into the pulmonary field. Lateral views of the chest are essential.

In infants tuberculous adenopathy is unique, the enlargement is relatively greater than in chil-

dren, and the glandular shadow often assumes the dimensions of a neoplasm.

Tuberculous hilum glands may cause all the phenomena commonly associated with a foreign body in the air passages, from the slightest lateral shifting of the heart shadow to well marked air-trapping, or complete occlusion of a bronchus.

In children the problem of diagnosis of tuberculous hilum glands becomes more difficult. It can rarely be stated from the roentgenogram whether disease of the intrathoracic lymph nodes is the cause of a child's symptoms. There may be no correspondence between the size of the glands and the severity of clinical symptoms. Neither can enlargement of tuberculous nodes always be distinguished from moderate tumefaction of hyperplastic lymph nodes, particularly in the absence of caseation or calcification. The roentgenogram is valuable, however, in showing whether the infection is confined to the bronchial nodes, thereby differentiating a benign condition from a graver one of actual pulmonary disease. Repeated roentgenograms are of great value in studying progress. Absorption of the hilum gland shadows and increased calcification are indications of favorable progression. It is not believed that the diagnosis of hilum gland tuberculosis in children should be made from the roentgenograms alone. Careful coöperation with the clinician is essential to the greatest degree of accuracy.

HILUM TUBERCULOSIS

Hilum tuberculosis is a much more common form of the disease in early than in adult life. But for the roentgenogram it would usually be undiscovered. The process originates at the root of the lung and extends outward a variable distance.

In infants it consists of a cheesy tuberculosis of the lung root tissues, rapidly progressive, with a bad prognosis. The triangular shadow of ordinary infantile pneumonia has its base at the periphery, whereas in hilum tuberculosis it is at the root. In our experience it was nearly always right-sided.

A second type of hilum tuberculosis occurs in childhood, commonest around the age of six, a relatively mild infection with a good prognosis.

Recurrent Hilum Pneumonia of Tuberculous Origin—Perifocal Tuberculosis—Paratuberculosis—Epituberculosis.—This is an interesting process characterized by the recurrence of symptoms of pulmonary infection at intervals of weeks or months during which time there may be varying degrees of cough, fever and, at times, a few physical signs. It affects both infants and children. Pathologically the process is an exudative one about a tuberculous lymph node, usually not due to a dissemination of tubercle bacilli, but to a cellular reaction around the central focus containing the infecting organism. The bacillus is not found in the infiltrated zone, the tissues being saturated with serum and lymphocytes, thus accounting for the complete disappearance of shadows by absorption. The process is, consequently, benign and always accompanied by an

intense skin reaction to tuberculin. Not all hilum pneumonias of the recurrent type are entirely free from tubercle bacilli, as not infrequently they leave in their wake fibrous changes, increased vascularity, or a small calcified area to mark the center of the previous process.

Tuberculosis of the lower lobes without coincident involvement of the apices is a more frequent happening in early than in adult life. It is due to a spreading of an inflammatory process from the hilum. In appearance it resembles an ordinary basal pneumonia, except that its upper border is sharply delimited from the unaffected lung above.

MILIARY TUBERCULOSIS

This may be a terminal phenomenon in any type of tuberculosis. In rare instances it is purely pulmonary, the infiltrations not regular in distribution, and there may be caseation or fibrosis. This type occurs secondary to an older lesion in the lung and may develop after the age of infancy. The first symptoms frequently follow closely upon measles or whooping-cough. The disease occasionally heals, though it is usually fatal.

Miliary tuberculosis of infants most frequently accompanies tuberculous meningitis. The picture is that of a generalized peppering of both lungs with miliary proliferative lesions. There is usually no evidence of older pulmonary lesions, but there may be telltale hilum glandular shadows. The tubercles may be conglomerate, grouped, and surrounded by an exudative zone.

ADULT FORMS

As puberty is approached, tendency to chronicity becomes manifest. Lesions are more indurated and the apical regions more susceptible. Caseation vies with fibrosis. The result is the multiform picture of fibrocaseous tuberculosis with cavitation and lobular pneumonia, characteristic of the adult. We have not seen this type of disease prior to the tenth year of age. It is rare before the twelfth year.

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DISCUSSION

WILLIAM H. SARGENT, M. D. (1624 Franklin Street, Oakland).—Doctor Karshner has given us a very interesting discussion of tuberculosis of the lungs of infants and children.

I cannot pass this opportunity of urging more such interchange of papers between the various sections as we have had here today, but especially do I wish to bespeak such interchange for radiology, which is so closely linked to all branches of medicine. It is an inspiration to us, it creates a much better understanding, and it tends to better service to our patients.

My conception of the pathologic processes following tuberculous infection in the lungs of infants and children is probably the same as Doctor Karshner's. However, I have been somewhat differently impressed with certain points. The cases studied in the out-patient department of the Baby Hospital of Oakland have been followed for a considerable length of time, and most of the patients have recovered, or are recovering. No effort has been made to differentiate these cases under any particular scheme of classification.

Analyzing the films taken of these patients it has been noticed that certain similar changes appear to be present in all, varying only in degree, not in char-

acter. In practically all the cases it would seem that there are evidences of a certain fundamental reaction of the tissues following tuberculous infection in the lungs of children. This reaction may vary greatly in degree of intensity and be very confusing or difficult to interpret, but it always seems to be present to some extent. According to Krause, a sensitization takes place following the initial infection, and thereafter the reaction is allergic in character. Apparently, the disease begins as a primary infection in the parenchyma of the lung, usually near the pleura. Surrounding this area, a pneumonic process or allergic reaction soon develops. This may vary from a slight reaction at the site of the primary focus to involvement of an entire lung. Soon after the primary infection, there is extension through the lymphatics to the regional lymph nodes in the hilum. Evidences of involvement of the hilum glands may vary as greatly as the evidences of involvement in the lung parenchyma. This entire process has been called the primary complex of Wrenche. It appears to constitute the fundamental reaction of the tissues to the tuberculous infection, varying only in degree. If the pneumonic or allergic process is very extensive, we may call it tuberculous pneumonia. Rapid caseation, breaking down and cavitation may occur, or more or less complete resolution. If this process in the lungs has disappeared and only the glandular involvement remains, we are prone to call the condition hilum tuberculosis.

This conception of the pathologic processes seems to fit more readily into the x-ray findings than would an attempt to otherwise classify them. Classifications, in reality, appear to be only different phases of the above process.

Serial films in the anteroposterior and diagonal directions are indispensable in the diagnosis of these conditions. Even then, there will be many cases where most careful correlation of all the findings will be necessary to arrive at a correct conclusion.

Through the helpful cooperation of Doctor Martin and others of the staff of the Baby Hospital, it has been possible to arrive at a reasonably definite conclusion in many cases. From our joint study of these patients, three significant points appear to be most important in the diagnosis: the x-ray findings, the history, and the tuberculin test.

✱

HENRY E. STAFFORD, M. D. (242 Moss Avenue, Oakland).—Doctor Karshner's correlation between x-ray findings and autopsy material is as instructive as it is infrequent. I do not feel qualified to discuss either the roentgenologic or pathologic findings. However, three clinical points were reemphasized to me by Doctor Karshner's paper:

1. The primary introduction of bacilli of tuberculosis often occurs under the guise of a mild upper respiratory infection. Consequently any involvement of the respiratory tract which does not clear within a reasonable time demands study, with tuberculosis in mind.

2. The frequency with which an old tuberculous focus is lighted up by one of the so-called childhood diseases, particularly pertussis and scarlet fever, justifies routine examination of all children one to two months following recovery from such diseases.

3. Changes in x-ray chest findings in tuberculosis occur more rapidly than is usually appreciated. As a rule this is due to allergic reaction in the lung parenchyma from a second infection or a fresh invasion by the original organism. To be unfamiliar with this marked shadowing and its rapid clearing may lead us to give a grave prognosis that is unjustified.

✱

LLOYD B. DICKEY, M. D. (Stanford Medical School, San Francisco).—Doctor Karshner is fortunate in being able to correlate so closely his roentgenologic studies with the anatomic findings. Others of us could learn much more that would help us, had we

this opportunity and also the diligence to follow cases as Doctor Karshner has done. It is at the necropsy mainly that many of our earlier impressions about the pathologic conditions in juvenile tuberculosis are being corrected. While the roentgenogram is probably the most important single item in diagnosing clinical pulmonary tuberculosis in childhood, in certain cases it is of no value except when correlated with history, physical examination, and tuberculin test. It is known that the hilar shadows during convalescence from pertussis and measles, and in cases of chronic bronchitis associated with infection of the accessory nasal sinuses (sinobronchitis) often cannot be told from those seen in tuberculosis of the hilar lymph nodes.

Doctor Karshner mentions the interesting linear shadows frequently seen extending from hilum to periphery. In a series of roentgenograms recently observed by Doctor Garland and myself at Stanford, we found these shadows to be present in 51 per cent of 327 cases in which the children were known to be tuberculous, and also in 48 per cent of fifty cases in children reacting negatively to large doses of tuberculin. In the first group the linear shadows were sometimes close to the initial lesion, sometimes distant, and often no primary lesion could be demonstrated when these shadows were present.

COLON RESECTION*

By ERNST GEHRELS, M. D.
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DISCUSSION by Robert C. Coffey, M. D., Portland, Oregon;
Foster K. Collins, M. D., Los Angeles.

IN colon resection the left side of the large intestine requires different surgical management from the right side. The one-stage operation for the right side of the colon, namely, the cecum and hepatic flexure, has generally been accepted as the best method, the ileum being planted into the remaining transverse colon. The left side of the colon presents a much more difficult problem. The two-stage operation for the left side of the colon was adopted by Paul in England and von Mikulicz in Germany. Their reason for this choice was the insecurity of colon anastomosis.

TWO-STAGE OPERATION FOR LEFT SIDE OF COLON

First Stage.—(a) The bowel is delivered outside the abdominal wall. (b) The bowel is usually resected a few days later so as to form a double-barreled artificial anus.

Second Stage.—Artificial anus is closed. Until recently, the majority of surgeons managed colon resections in this manner. Lately, however, an increasing number of surgeons prefer a three stage operation for all cases of cancers of the left side of the colon, both in ileus and in non-obstructive conditions.

THREE-STAGE OPERATION FOR LEFT SIDE OF COLON.

First Stage.—An exploratory laparotomy is performed. If the case proves to be an operable cancer some type of cecostomy or colostomy is done.

Second Stage.—(Main operation)—Bowel resection and immediate end-to-end anastomosis. Sometimes in nonobstructive cases, the first and

second stages of this procedure are combined. A complete primary operation with a safety cecostomy is performed.

Third Stage.—Closure of preliminary cecostomy or colostomy. Rarely does a spontaneous closure of a cecostomy or colostomy occur. Spontaneous closure could hardly be expected, as this operation is done to keep all fecal contents from the left side of the colon.

The question of choice between one, two or three-stage operations must be considered.

To undergo three operations when one might suffice, is naturally a hardship for the patient. Surgeons generally acknowledge the one-stage operation to be of greater risk to the patient's life. For this reason the two or three-stage operation is preferred. The one-stage operation, however, is still frequently done by well-known surgeons, as by Moynihan in England.

Personally, I am opposed to the one-stage operation. At the present time I favor either the two or three-stage operation, as do the majority of French and American surgeons.

In Germany, at the 1926 Surgical Congress, the problem of colon resection was widely discussed. Several German surgeons showed a marked preference for the one-stage operation in nonobstructive cases. In the Mayo Clinic, the one-stage operation of the left side of the colon is rarely done. In 1924, the Mayo Clinic reports showed the Mikulicz procedure to have been used in 183 cases with a mortality of 9 per cent. Judging from the latest publications, a modified three-stage operation, with preliminary cecostomy or colostomy of the transverse colon is being frequently performed.

MIKULICZ PROCEDURE IN COLON SURGERY

It may be timely to review the entire problem and to determine the place of the Mikulicz procedure in colon surgery. As far as mortality is concerned, the Mikulicz procedure has the unquestioned advantage over every other method. The following statistics of the Mikulicz operations show up better than the best statistics with other procedures, for instance, the latest statistics of Rankin with a mortality of 12 per cent.

Surgeons	Cases	Operative Mortality Per Cent
Mikulicz	34	12
Mayo	183	9.6
Cruet	38	5.3
Quenu	74	8

The criticisms of the Mikulicz operation are largely based on the following:

Insufficient removal of the bowel;

Insufficient removal of the mesentery and the glands in the mesentery;

Implantation of cancer into the abdominal wound;

The Mikulicz operation is not sufficiently radical.

To avoid these dangers, it is necessary to do the first steps of the Mikulicz operation in one day and not several days apart. We excise the bowel immediately, at least two inches away from

* Read before the General Surgery Section of the California Medical Association at the fifty-eighth annual session at Coronado, May 6-9, 1929.

the tumor on each side, using the cautery over crushing clamps, which remain on each bowel opening for twenty-four to forty-eight hours. If we wait several days before excising the gut, retraction of the bowel occurs and the resection may take place too close to the tumor. Implantation may also result.

If immediate emptying of the bowel be desirable, a Paul tube is tied into the upper or both openings. The danger of peritonitis is negligible. F. Rankin has reported one case in which the upper bowel end slipped back and caused peritonitis. The danger of retraction can be avoided by sufficient loosening of the extraperitonealized bowel.

In this procedure, the mesentery with its glands is immediately resected just as radically as in a one-stage operation or a three-stage operation. There is no reason why we should not mobilize the bowel and cut the mesentery to the same extent in a Mikulicz operation as in a one, two or three-stage operation. If done in this manner, the Mikulicz operation is not an incomplete operation. As far as permanent cures of cancer are concerned, the Mikulicz operation is not inferior to any other procedure. This fact has been demonstrated by large Continental experience.

The unpopularity of the Mikulicz operation has mainly been due to the difficulties in closing the double-barreled colostomy. As one well-known surgeon has put it: "The Mikulicz procedure may be safe, but it is slow and disagreeable."

The original procedure has two weak points:

1. The abolishing of the spur by the unsurgical procedure of the crushing clamp. This has often led to peritonitis and to secondary stenosis or ileus, to say nothing of the pain involved and the occasional hemorrhage.
2. The closure of the fecal fistula by an extraperitoneal plastic has often been unsuccessful, necessitating a second closure.

TECHNIQUE OF CLOSING THE ARTIFICIAL ANUS

The two weak points above outlined can be mastered by the technique described below. This technique, which was used in twenty-six

TABLE 1.—Usefulness of the Mikulicz Method Under Different Pathological Conditions

Condition	Mikulicz Operation	Reasons
Volvulus of cecum or sigmoid with gangrene.	Only possible method.	
Phlegmonous colitis, (most commonly of cecum).	Often indicated.	Bad condition of patient requires short procedure.
Irreducible intussusception.	Often indicated.	Bad condition of patient requires short procedure.
Diverticulitis.	Best procedure.	Perforation into bladder, (common complication of diverticulitis), etc.
Megacolon.	Best procedure.	Colon difficult to empty by cecostomy.

cases in Payr's Clinic, Leipzig, Germany, was published by me in the *Deutsches Archiv. fuer Klinische Chirurgie* in 1921.

The procedure I recommend avoids the crushing of the spur and closes the artificial anus in one stage, three to six weeks after the main operation. This allows sufficient time for the inflammatory edema of the peritoneum and intestines to subside.

The skin incision is carried around the double-barreled anus. The two edges are sutured to cover the colostomy openings. After changing gloves, the succeeding layers of the abdominal wall, fascia, muscle and preperitoneal fat are amply dissected. It is important to dissect the scar tissue of the preperitoneal fat extensively until loose preperitoneal fat is exposed all around. Only after this has been done, do we detach the two bowel ends from the parietal peritoneum, dissecting the intra-abdominal adhesions under the guidance of the left forefinger. We do not hesitate to open the abdominal cavity whenever it is necessary in order to loosen the two bowel ends so completely that an end to end union can be made without any tension. Increasing experience shows the danger of peritonitis to be small.

We have very little trouble with the spur. In the first place, we do not artificially establish a spur at the time of the first operation by parallel fixation. The short spur that is present disappears to a great extent after the two bowel ends have been detached from the abdominal wall, the intestine sinks back and the spur has disappeared. If there should be a spur formation remaining, it is only necessary to dissect a short distance between the two bowel ends and resect this part of the bowel wall. The union of the bowel is done with interrupted stitches, using silk for the outer layer. In this procedure, the only danger of leakage is at the anterior suture line. The danger is met by sewing the anterior suture line into the peritoneal wall, which is left open at this point. The abdominal wall is sutured in layers, leaving an opening for a rubber dam which goes down towards the suture line.

This whole technique may appear much more dangerous than the former extraperitoneal procedure. On the contrary, it has proved to be surprisingly safe. It can be done under local anesthesia.

As I have stated previously, I published from Payr's Clinic, twenty-six cases of artificial anus which had been closed by this technique. Sixteen more cases from the same clinic have been reported since, with no death, making forty-two cases with only one death. Only in three cases in the beginning of the series did a fecal fistula develop, which, however, closed spontaneously. This procedure has made the closure of an artificial anus in one sitting a reliable procedure.

It is easy to understand why this procedure is associated with so little danger:

In the first place, some adhesions are always left surrounding the operative area and reform very quickly postoperatively.

In the second place, the resistance of the peritoneum and abdominal wall against infection seems to be increased at this time, about four to six weeks after the main operation. It is surprising to see the abdominal wall unite by primary union in almost all cases.

In the third place, should leakage of the suture line occur, it will be in front, and a fecal fistula will result without general peritonitis.

This procedure is neither original nor new. Many surgeons are closing the artificial anus in the same way. In the textbooks and surgical publications on the Mikulicz procedure, the crushing clamp is still advocated. The fact that the type of procedure I have described is not only safe but considerably shorter, is at present not well enough known. Formerly the duration of the Mikulicz method averaged at least three months. Our procedure shortens the time to six weeks. I might describe this procedure as being midway between an entirely extraperitoneal and an entirely intraperitoneal one. It is often necessary to open the peritoneum all around. In five of our patients the peritoneal cavity was not opened at all. The main requirement is the same as it is in all attempts at closing a fistula at any point in the body, namely: to loosen the affected parts abundantly before attempting to sew them together.

COMPARISON OF ONE, TWO AND THREE-STAGE PROCEDURES

My experience does not accord with those surgeons who advocate a one-stage operation. In the one-stage operations, I have lost two out of four patients. Each time I have felt that I might have saved the patient had I resected in two stages.

In a collection of statistics of 136 cases of one-stage operation of the left side of the colon published by F. Nordmann, there was a mortality of 30 per cent. In my opinion this mortality is too high.

In comparing the advantages of the Mikulicz operation with the three-stage operations, the following points have to be considered:

First.—If a preliminary cecostomy is done blindly from a small right side incision without exploration, the case may prove to be inoperable later and there will be the disadvantage of a fecal fistula on the right side. Accordingly every operation, unless in the presence of acute obstruction, should begin with a wide incision and exploration. This makes the preliminary operation a fairly extensive one in the three-stage operation.

Second.—A cecostomy is not reliable for preparing the left side of the colon for the main operation. A cecostomy with a small catheter, as is sometimes recommended, will not suffice at all to empty the left-sided colon and the transverse colon, which after a cecostomy are often filled with hard fecal lumps. F. Rankin and Jones of Boston recommend the use of a half-inch tube for the cecostomy. In cases of severe obstruction, this is insufficient to empty the left side of the

TABLE 2.—Usefulness of Mikulicz Procedure in Cancer in Various Locations of the Colon

Site of Cancer	Mikulicz Operation	Reasons
Transverse colon.	Advisable.	Vascular supply of transverse colon unreliable.
Splenic flexure. Descending colon.	Advisable. Advisable.	Operation usually difficult and long. Transverse colon sometimes hard to empty by cecostomy.
Upper sigmoid.	Advisable.	The suturing of the descending colon to the lower sigmoid is disagreeable, because descending colon has large posterior peritoneal defect.
Lower sigmoid.	Advisable.	Pelvic colon can be mobilized.

colon. Not long ago, I had an experience of this kind. In spite of the preliminary cecostomy, I found the left-sided colon still distended. Doctor Jones and other colon surgeons record this same experience. When we do the intestinal anastomosis in the Mikulicz method, the left-sided bowel is in a condition of complete collapse, and in perfect condition for suturing.

Third.—In the second stage of a Mikulicz operation, the parts to be united are free of any tension. Their blood supply is absolutely assured. In the three-stage operation, the bowel anastomosis is done after extensive cutting of the mesentery. In these cases, we know that the blood supply is uncertain. Especially in a stout individual with a fat mesentery, is it hard to be certain of the blood supply of the parts.

Fourth.—In the Mikulicz method, the entire procedure is divided into two nearly equal parts. In the three-stage operation, the second stage is a very extensive one; especially if the case be complicated by adhesions of the tumor to the small intestine, the bladder, the uterus, etc., requiring a resection of these parts. In these cases we are glad to put off the intestinal anastomosis until the peritoneum has had time to repair the extensive trauma.

Fifth.—The Mikulicz procedure, as I have described it, requires less time in the hospital and less expense to the patient than the three-stage operation.

The resection, with preliminary cecostomy, amounts to a three-stage operation. A cecostomy large enough to keep the left colon free from fecal matter, rarely closes spontaneously. A third operation is required for its closure. One of the arguments that may be given in favor of the three-stage operation is that it permits the employment of the so-called "aseptic technique" of colon anastomosis. The best "aseptic technique" will break down and cause leakage if the blood supply of the parts is insufficient. At present, the "aseptic technique" offers no inducement to abandon the Mikulicz procedure. The main argument in favor of the three-stage operation is the protection that the cecostomy affords to the suture line. In spite of this protection, it is not always possible to avoid leakage. The cause of leakage is just as

much a question of proper blood supply as it is of fecal tension. The safety of the colon suture in the Mikulicz method would be hard to surpass. In my opinion, the Mikulicz operation offers a safer union of the large bowel than any other method.

Three great factors make for the safety of the Mikulicz method:

1. The complete collapse of the bowel;
2. The lack of tension;
3. Assurance of perfect blood supply, and
4. (Incidentally.) The extraperitoneal operation.

MIKULICZ PROCEDURE IN ACUTE ILEUS

For acute ileus, Mikulicz abandoned the extraperitonization procedure. In these cases he did a three-stage operation, beginning with a colostomy. This was before the time of x-ray localization. Nowadays a barium enema before operation allows us to localize an obstructing tumor of the large intestine.

If a long-looped sigmoid with an obstruction at the highest point of the loop is demonstrable, I think it permissible occasionally to extraperitonize the loop and immediately establish the double-barreled anus with two Paul tubes. We always empty the colon before sewing the bowel into the peritoneum. In this way the ileus is more rapidly relieved than by a cecostomy.

SUMMARY

For the reasons I have outlined, I am doing a Mikulicz operation in the majority of cases. It is a mistake to enforce the Mikulicz operation in every case. If in opening the abdomen we find

1. A large growth with infection of the bowel wall and adjacent tissues, or
2. A growth associated with advanced obstruction, or
3. The patient in bad condition,

even the first stage of a Mikulicz operation may be too much for the patient's endurance. Under such circumstances, it is better to prepare the patient for the main operation by a preliminary cecostomy or colostomy, which I establish in order to divert the entire feces from the left side of the colon. The following step may be either a complete operation of bowel resection and anastomosis or the first stage of a Mikulicz operation in complicated cases.

The favorite locations for the Mikulicz operation are the sigmoid and the transverse colon. For the splenic flexure and especially the descending colon, it is sometimes better judgment to do a three-stage operation. It is best to approach these cases without a preconceived procedure in mind, and after proper exploration, to decide on whatever form of operation is indicated. Most of us are inclined to grow partial to one method. However excellent, one method does not fit every case. Certain cases of early malignancy may even permit of a complete one-stage operation. In such cases, I always add a small cecostomy or ileostomy as a safety measure.

In my opinion, the two-stage operation of Mikulicz deserves a dominating place in colon surgery. I recommend abandoning the crushing clamp and to do a resection of the artificial anus in the manner I have described. I feel sure you will like the Mikulicz procedure much better when done in this manner. I trust that Tables 1 and 2 may prove helpful.

490 Post Street.

DISCUSSION

ROBERT C. COFFEY, M. D. (611 Lovejoy Street, Portland, Oregon).—Concerning the importance of the Mikulicz operation, I am entirely in accord with Doctor Gehrels. It is, of course, ideal to do an immediate excision of the sigmoid or left-sided colon with direct end-to-end anastomosis. But, idealism in intestinal surgery is the most fatal of all sentiments, and no matter how much experience a given operator may have had or how skilled he may become he will have a greater mortality in doing ideal resections of the colon than he would if he used the Mikulicz principle. I think there is no doubt that the Mikulicz principle is the most important single contribution that has been made on the surgery of the large intestine.

I entirely agree with Doctor Gehrels as to the method of performing the first part of the Mikulicz operation. I appreciate that the splendid method which Doctor Gehrels has shown for closing the colostomy is entirely practical, but I do believe that it is entirely unnecessary to open the abdomen for the purpose of closing a colostomy wound.

In earlier years, in operating for appendicitis, when the operation was done very late and consisted of opening an abscess, it was not uncommon to have extensive fecal fistulae. At that time I published an article on "Remote or Indirect Subperitoneal Drainage in the Extraperitoneal Closure of Persistent Fecal Fistulae" in *Annals of Surgery*, June 1907. If a colostomy is made properly, it may be closed by this method with practically no danger at all. It is about as follows: An incision is made which extends from about two to three inches above and an equal distance below the fistula and is made to surround the fistula. The first incision goes through the skin and fat down to the aponeurosis. This layer of fat and skin is dissected off the aponeurosis for a distance of at least two inches on all sides. The aponeurosis and the muscle are similarly separated and similarly lifted so that there are spaces of at least two inches between all the layers of the abdominal wall, which extend in all directions. After this separation has taken place the fistula stands up like a crater coming off from its attachment to the peritoneum. It is trimmed off, turned in and sutured, and dropped back with the peritoneum. Silkworm sutures are then passed through the skin, fat, muscle, and aponeurosis and left untied. The various layers are then sutured individually, after which silkworm sutures are tied over a roll of gauze or through small segments of tubing. By this means, all the layers are held firmly together while the two-inch spaces all around the line of suture permit of drainage of all these planes to the tubes which are placed at the two ends of the incision down to the peritoneum. If the fistula is in the abdominal wall, where all the layers may be freely separated, this operation is almost 100 per cent successful. It has been described in a number of books and has been given particularly prominent space in the fourth edition of Moynihan's "Abdominal Operations."

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FOSTER K. COLLINS, M. D. (1930 Wilshire Boulevard, Los Angeles).—The Mikulicz method of resection is a life-saving measure in conditions where an immediate, more prolonged operation might fail. It is particularly indicated and, I think, should usually be limited to those cases where a short portion of intestine is found so damaged that it cannot temporarily

be returned safely to the abdomen, and to the occasional small scirrhous carcinoma easily brought outside the abdomen. I feel we are much indebted to Doctor Gehrels for his timely and very comprehensive contribution on this method.

I agree that when cancer of the transverse or descending colon is found, whether totally or partially obstructing, an immediate resection is rarely indicated. In nearly all of my recent resections of any portion of the transverse or descending colon, I have first done a cecostomy. This not only prepares the patient by permitting the acute symptoms to subside, but acts as a vent for gases, preventing distention and a possible blow-out at the suture line after resection. A cecostomy also has the advantage of being well to the right, leaving a clean uncontaminated left abdominal field for a safe radical resection in usually about ten days.

In opening an abdomen for suspected cancer beyond the ascending colon, a left outer rectus incision will permit inspection and exploration to determine the location and involvement. If it is a case for resection and the involved portion can safely be replaced in the abdomen, my usual practice is to decide against a Mikulicz. I then insert my hand over to the right lower abdomen and determine where a knuckle of cecum can best be made protrude through an incision farthest to the right above the ileac crest. The incision through the abdominal wall is no longer than the knuckle of cecum requires for an ample protrusion and opening. Absorbable sutures placed in the outer coats of the cecum, peritoneum and fascia, secure the knuckle. No sutures are placed in the skin and there is no later infection. If the distention is acute and symptoms urgent, a drainage tube can be at once purse-stringed into the cecum as soon as the left rectus incision has been closed and protected by vaselin gauze. The left abdominal wall can be thus left free from contamination for the later resection. Through a large drainage tube in the cecum the colon is gradually washed out with saline and there is no contamination of the cecostomy dressing for three or four days. When the tube loosens, an ample opening is made and drains the entire colon quite satisfactorily with irrigation. This cecostomy opening, in my experience, either closes of its own accord or can be closed with a few stitches when it is no longer required, without entering the abdomen.

Doctor Gehrels states one of the main objections to the Mikulicz operation in cancer has been that it might not be radical enough—that involved glands in the mesentery may not be removed. It has been my experience that, as the operation is usually performed, this is true and I think a more open procedure is indicated in cancer cases, if, when the abdomen is first opened, it is found the involved section of bowel can be temporarily replaced.

In a resection the all-important points are: removal of involved glands, prevention of impaired circulation at the suture line to avoid a blow-out from necrosis and provision to prevent distention.

After resection, I usually do an end-to-end anastomosis by my aseptic technique published in the *Annals of Surgery*, December 1922; but safeguard this suture line from a blow-out by invaginating it into the gut below for an inch or so, suturing the gut wall from below up over the suture line. A tube is inserted through the anal canal, and, guided by the hand in the abdomen, passed up beyond the anastomosis several inches. With both tube and the cecostomy functioning there is no dangerous distention and rarely even a temporary fecal fistula at the point of resection. No drainage is employed. The average hospital stay is from three to four weeks from the time the patient first entered.

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DOCTOR GEHRELS (Closing).—We all agree on one point, that a one-stage operation on the left side of the colon is rarely advisable. The choice rests between a Mikulicz operation and a three-stage opera-

tion as Doctor Collins outlined. To compare the advantages of these two methods has been the object of this paper. In order to do colon surgery most successfully, a familiarity with both methods and their advantages is necessary. The choice of method will have to be determined by the anatomical findings in each individual case. For the majority of cases, I have found the Mikulicz operation most satisfactory when done in the way I have outlined.

It pleases me to hear that Doctor Coffey, with his great experience in colon surgery, is well satisfied with the Mikulicz procedure.

My experience with the crushing of the spur and the extraperitoneal closure of the resulting fecal fistula in the second stage of the Mikulicz operation has been less fortunate than Doctor Coffey's. This was the reason for ceasing to crush the spur, and for adopting the procedure which was described.

DIVERTICULA OF THE URINARY BLADDER IN WOMEN*

REPORT OF CASES

By JAY J. CRANE, M. D.
Los Angeles

DISCUSSION by Herbert A. Rosenkranz, M. D., Los Angeles; George F. Schenck, M. D., Los Angeles; J. C. Negley, M. D., Los Angeles.

IN the United States only five cases of diverticula had been reported prior to 1906, and these were in men. Since the advent of our present-day cystoscopic and improved roentgen ray technique, diverticula have frequently been seen. There is scarcely a clinic that has not reported a large series of cases. These reports have been very complete and extensive. In fact, there has been so much written regarding diverticula that it is not necessary to dwell on the subject in detail. However, since diverticula in women are relatively rare, comprising about 5 per cent of all reported cases, the three cases here reported were thought to be of sufficient interest to merit mention.

In attempting to prove the etiology of diverticula much careful study has been done by urologists but their opinions are still divided. Thus some believe that all diverticula are congenital; many believe that they may be either congenital or acquired; while still others contend that they are always acquired. It is true that nearly all of the diverticula seen in men are associated with obstructive lesions at or below the bladder neck. This fact also holds true for women. The three cases of diverticula and one case of an incipient diverticulosis are here reported because of their unusual occurrence in women and because of the definite symptom complexes and pronounced pathological findings.

REPORT OF CASES

CASE 1.—Mrs. E. M., Case 281731, Los Angeles General Hospital. Age 41.

Complaint.—Came for relief of: (1) difficulty in urinating; (2) pain over bladder region; (3) sand in urine; (4) hematuria.

*Read before the Urology Section of the California Medical Association at the fifty-eighth annual session at Coronado, May 6-9, 1929.



Case 1.—Large multiple diverticula urinary bladder.

Examination.—Revealed an acute retention of urine due to a filiform stricture of the urethra. This was gradually dilated over a period of weeks until a cystoscope could be introduced into the bladder. A large diverticulum was found behind the right ureteral orifice and still another on the posterior bladder wall and another almost in the vault of the bladder. The largest diverticulum, which was situated behind the right ureteral orifice, did not drain freely. Some small particles of sand were washed out through the cystoscope.

Diagnosis.—Diverticula of the urinary bladder, due to strictures of urethra.

Case 2.—Mrs. I. F. W. Case 40166 Los Angeles General Hospital. Age 81.

Complaint.—(1) Extreme frequency; (2) intense dysuria especially at close of urination; (3) senility. Symptoms have been progressively growing worse for the past six months until at the present time the patient can scarcely control urine.

Examination.—Large cystocele and procidentia of uterus.

Cystoscopic Examination.—On entrance, 200 cubic centimeters of residual urine was found in the bladder. At the time of cystoscopic examination 30 cubic centimeters residual urine was found after patient had been in bed for a few days. Her symptoms also improved with bed rest. There was a small caruncle at external meatus of urethra and a marked cystocele. The bladder mucosa was acutely inflamed, only slight trabeculations being seen. Behind the right ureteral orifice on the wall of the bladder was the mouth of a large diverticulum which would hold approximately 75 cubic centimeters of fluid. This seemed to empty completely when the patient would lie down.

Diagnosis.—Diverticulum of the urinary bladder, due to procidentia of the uterus and cystocele.

Case 3.—Mrs. O. M. Case 39704, Los Angeles General Hospital. Age 38.

Complaint.—She was admitted to the hospital for relief of difficulty in urinating, fever, pain and swelling over lower part of abdomen.

Examination.—Revealed the absence of labia majora and external meatus urethra. Previous records disclosed that a few years previously the patient had had genital ulcers resembling tuberculosis and had had them cauterized with the actual cautery. A dimple in a mass of scar tissue was all that remained of the external urethral orifice.

Cystoscopic Examination.—Under spinal anesthesia a filiform was introduced. Later a small cystoscope was passed. A large, badly infected diverticulum was found on the left wall of the bladder. These findings were verified with a cystogram.

Diagnosis.—Diverticulum of the urinary bladder, due to stricture of urethra.

Case 4.—Mrs. B. Case 21902, Hollywood Hospital. Age 69.

Symptoms.—Came for the relief of frequent painful urination and of constant desire to urinate, which she had endured for several years. When she developed a severe hematuria she sought relief.

Examination.—Revealed: (1) A procidentia of the uterus to such an extent that the cervix was protruding out of the vagina; (2) marked cystocele.

Cystoscopic Examination.—Revealed a minimum of 20 cubic centimeters of residual urine. The uterus was reduced before the cystoscope could be passed successfully. Bladder urine was bloody and contained many small blood clots. The mucosa was intensely inflamed. Two small diverticula openings were immediately noted, one on the posterior bladder wall and the other almost in the vault of the bladder. Trabeculation was general and well developed and many large cellules were also present, some of which were almost full-fledged diverticula. The bleeding was from the intensely inflamed mucosa.

Diagnosis.—Incipient diverticulosis of the urinary bladder, due to procidentia of uterus and cystocele.



Case 2.—Large diverticulum filled with sodium iodid, and ureteral catheter in diverticulum bladder filled with air.



Case 3.—Bladder filled with air and large diverticulum filled with sodium iodid.

COMMENT

Symptoms.—There was no definite symptom complex which would indicate that a diverticulum was present. I believe that bladder tenesmus as demonstrated by severe, excruciating pain during and just following urination, is the most common symptom. Especially is this true when the diverticulum does not empty freely. Some emphasis has been put upon the inability of a patient to completely empty the bladder at one sitting, thus requiring two or more successive micturitions. Patients with diverticula whom I have examined and who have experienced this symptom complex have had obstructive lesions at the bladder neck and I could not ascertain whether the symptoms were due to the obstruction or diverticula. Most diverticula are symptomless until infection occurs due to poor drainage in the diverticulum itself or at the bladder neck. Poor drainage inevitably ends in infection, not only of the diverticulum, but of the bladder as well, which itself also produces symptoms. Thus the symptoms of a diverticulum are similar to those of an infected bladder or those of a bladder neck obstruction where a stone is present. "In short the subjective symptoms of a poorly draining infected diverticulum especially in the presence of ammoniacal urine are not exceeded by advanced vesicle tuberculosis, carcinoma, or stone."¹ One patient came for the relief of hematuria as a major symptom. Two came chiefly because of difficulty in urinating, and in the fourth case, a mild incontinence was the most distressing symptom. Thus there are no symptoms so constant and accurate that the diagnosis of a diverticulum can be made without the cystoscope and roentgen ray.

Diagnosis.—Most diverticula are found during the process of a routine urological examination. This was true in our four cases in women. We were searching for the cause of their symptoms when the orifices of the diverticula were seen with the cystoscope. Cystoscopic examination will usually reveal the presence of a diverticulum, but it alone cannot tell the whole story. An opaque catheter curled in a diverticulum, a cystogram, and a contrast cystogram taken in more than one plane will give an accurate idea of the size, exact location, number and whether they are in a position to drain freely or not.

Treatment.—The consensus of opinion is to relieve the obstruction whether in the urethra or at the bladder neck, before or at the time of doing the diverticulectomy. This is essential if reoccurrence of the condition is to be avoided. However, excision of the diverticulum is not always necessary after the obstruction is relieved if it drains well. Pousson sutures the orifice of the diverticulum without excision of the sac. Chute and Pousson also enlarge the orifice, especially in cases that will drain. Young, Hinman, Howard, Lomer and Squier do a radical excision of the diverticulum in toto, as do MacGowan, Day and Rosenkranz.

2007 Wilshire Boulevard.

REFERENCE

1. Day and Martin: Diverticulum of Urinary Bladder, J. A. M. A., January 24, 1925, Vol. 34.

DISCUSSION

HERBERT A. ROSENKRANZ, M. D. (1024 W. P. Story Building, Los Angeles).—This is an excellent presentation of a series of rare cases. Doctor Crane has, for the first time in medical literature, emphasized proci-dentia and cystocele as a cause of diverticulum. The more frequent cystoscopy of cases of stubborn "bladder trouble" will, of course, reveal an ever-increasing number of diverticula.



Case 3.—Bladder and diverticulum, both filled with sodium iodid.



Case 4.—Incipient diverticulosis, urinary bladder.

As Doctor Crane has noted, we have achieved cures by peeling out very large diverticula, some of them larger than the bladder itself. Those situated at the base of the bladder cannot drain and become filled with a foul jelly-like pus. These must be drained suprapubically by a large Pezzer catheter in the diverticulum itself to relieve the patient of his dangerously toxic condition prior to diverticulectomy. In some cases however that present no line of cleavage, I enlarge the orifice in a stellate direction and apply the Percy cautery contacting pretty thoroughly to the mucosa of the diverticulum twice rapidly at low heat. About two years ago at the General Hospital I first applied this method with the result that when Doctor Negley cystoscoped the case several months later the diverticulum had disappeared with hardly a trace. I usually drain the diverticulum cavity laterally to the bladder and suture the orifice of the diverticulum. Although diverticula have occasionally been resected deeply so that a thick walled viscus is removed I consider this a dangerous procedure in view of the danger of injury to the rectum, peritoneum, ureters, large vessels and other organs.

My experience urges me to emphasize the advantage of suturing the circularly incised bladder at the neck of the diverticulum to the skin at the beginning of the operation in order to facilitate peeling out the diverticulum. The sponge forceps is ideal for grasping the edges of the diverticulum and should be adopted in place of the Allis clamps still featured in the textbooks.

The surgery of this condition is going to become of ever-increasing importance when more diagnoses are made and when the life-shortening complications of this condition are more widely appreciated.

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GEORGE F. SCHENCK, M. D. (511 Westlake Professional Building, Los Angeles).—Doctor Crane has presented an interesting series of cases that are sufficiently rare to warrant consideration. It is to be noted that two of his patients had strictures of the urethra, and two had marked cystoceles and procidentia. Urinary obstruction plus residual urine terminated in hypertrophy of the bladder musculature, and caused the appearance of trabeculations. The

diverticula are just a step further in the destructive processes of obstruction in the lower urinary tract.

Frequency, dysuria, hematuria, pyuria, and incontinence were the cardinal symptoms in all of his cases, as they are in 90 per cent of all urological cases. To the urologist each one of them is a signpost recommending a urological study for the purpose of making a diagnosis. The early recognition and treatment of urinary obstruction in the upper and lower urinary tracts has amply demonstrated the merits of urological study. For some unaccountable reason, the same symptoms in female patients do not maintain the same significance to many physicians. A thorough urological study will reveal a definite cause for their urinary disturbances, and offer treatment that is not empirical.

Doctor Crane has pointed out to us that diverticula occur in women, and the symptoms are precisely the same as they are in male patients. The etiological factor in 50 per cent of his cases was stricture of the urethra, which, contrary to general opinion, is relatively common in women. The other 50 per cent were caused by procidentia, and cystocele; and both exist to some degree in every multipara.

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J. C. NEGLEY, M. D. (Brack Shops Building, Los Angeles).—Doctor Crane has covered this subject in such a comprehensive manner that discussion is rendered difficult.

The problem of the treatment of diverticula in women is much less complicated than in men, because the latter have more anatomical or physiological reasons for developing diverticula. I agree with the writer that procidentia is a cause of diverticula, but with reluctance would accept cystocele alone as a cause of diverticula. If such were the case, surely more diverticula would have been reported in women.

Since these cases have marked tenesmus, severe, agonizing pain and marked reaction, following cystoscopy, the most gentle procedures should be adopted for their diagnosis. The procedure of coiling a rather stiff ureteral catheter in the diverticulum and allowing it to remain for all the subsequent moving about for x-rays, is unnecessary and pain-producing, and serves to lower the resistance of an already debilitated patient. Cystograms should not be repeated too many times, even if scientific knowledge is gained thereby. Only mild solutions, such as neosilvol, 15 per cent; argyrol, 20 per cent; campidol, 12½ per cent; argo iodine, 2 per cent; and if sodium iodide is used, not over a 6 per cent solution is advisable.

Patients with diverticula are generally poor surgical risks and the more conservative methods for their relief are much to be preferred. Complicated and bizarre methods for resection of the diverticulum subject the patient to a long stay on the table, a protracted convalescence and in a large number of cases a lowering of bladder capacity to a marked degree.

Procedures for relief of obstruction, whether such be from urethral stricture or one of the many bladder neck or other conditions become primary in importance. Surgical procedures on the diverticulum are many and varied. Our preferences include the use of the cutting cautery on the most dependent margin surrounding the opening—a similar use of a Young's punch or the rongeur or resection of a wedge-shaped section, similar to the technique of trigonectomy for hypertrophied trigone. If any of the latter three are used, measures directed to the control of hemorrhage should be instituted including use of the Tollyson punch, or diathermy. If extensive resection is performed on a dependent margin of a diverticulum, interrupted sutures to control hemorrhage are always applied to the cut edges.

ANATOMICAL VARIATIONS OF ACCESSORY NASAL SINUSES*

By EDWIN S. BUDGE, M. D.
Los Angeles

DISCUSSION by C. Latimer Callander, M. D., San Francisco.

ATREATISE dealing with anatomy, of necessity is one that is not new. But since sinuses have such various ramifications, sizes, and wall limitations, it may be interesting to review the subject. A knowledge of the anatomical variations of the nasal accessory sinuses is necessary if the signs of complications, which show themselves through their bordering walls, are to be recognized and if proper drainage, which is the only hope of cure, is to be established.

FRONTAL SINUSES

The frontal sinuses may be entirely absent, or may be present only on one side, or may occur on both sides with one side overlapping the other either in front or behind. They may extend from the roof of the orbit to as much as forty millimeters into the spongiosum of the frontal plate. They may extend posteriorly over almost the entire roof of the orbit back to the lesser wing of the sphenoid, or the depth may be but a few millimeters. This is most important in selecting the operation of preference when it is necessary to establish surgical drainage. The shallow sinus makes operation hazardous by the intranasal route, for fear of coming into the anterior fossa of the brain, while the deep sinus makes any of the radical operations less favorable for a cure, and especially those which have been worked out to preserve facial contour. The larger the sinuses the thinner the walls and the more closely do such sinuses encroach upon vital structures. The posterior wall may be so thin that only a tissue-paper thickness of bone is between it and the brain cavity. The floor of the frontal sinus, which is the roof of the orbit, is equally as thin and in some cases a dehiscence in the bone is present. In these cases destruction of the lining membrane by disease or in the course of operation may result in eye complications.

Recently I have had two patients come to me only after the anterior wall, which is the plate of the frontal, was completely eroded; both reporting because of a prominence on the forehead, following a protracted period of headache. The prominence in one patient was in the center, and at operation it was discovered that both sinuses opened into this prominence. In the other patient the prominence was over the left sinus, but the left sinus extended thirty millimeters to the right of the median line, and was situated posterior to its fellow of the opposite side.

When at operation it is revealed that the posterior wall of the frontal is bulged far forward, it may be an overlapping of the sinus of the oppo-

site side posteriorly, or a bulla frontalis which is pushed up from the anterior ethmoids. The ostium of the frontal varies greatly in size and shape from the type which is very short and straight and which is easily entered, to one that is long, narrow and cork-screw in its course. The hiatus semilunaris may be very narrow as a result of an overhanging of the uncinat process or the pushing forward of the bulla ethmoidalis. In such cases it may be necessary to remove the uncinat or the bulla in order to probe the sinus. While the frontal more often opens into the hiatus, it may open into an adjacent anterior ethmoid cell or into the bulla, or the hiatus may end in a blind ethmoid cell. Ethmoid cells may open into the hiatus as well as the frontal, which not infrequently is the cause of difficulty in reentering a frontal after it has once been probed successfully. In such cases a notation should be made upon the patient's history chart.

At the present time I have a patient who has two distinct ostia leading into a very large left frontal. X-ray has not shown any irregularity in the sinus, but I am able to wash from the sinus separate quantities of pus from the two openings.

In one of the slides photographed from an actual specimen, and which will be thrown upon the screen, the individual had three separate frontal cavities; the left cavity opening into the usual place, the middle cavity into an anterior ethmoid and then into the hiatus, and the right cavity opening directly into the right maxillary sinus.

MAXILLARY SINUSES

The walls of the maxillary sinuses may vary from the normal to an almost complete absence, a mere slit being present on one or both sides. In such cases both may be so small that the canine fossa is so receding that considerable deformity of facial contour is noticeable. The recognition of such abnormalities is important in deciding the route of approach when it is necessary to radically operate such sinuses.

The Stewerman-Canfield operation, which I personally prefer, would not be applicable in these cases with receding anterior wall, nor would the preturbinal procedure, but the Caldwell-Luc operation would be better.

While variations in the maxillary sinus are less common than in other sinuses, the posterior superior angle may be pushed high up, mesial to the orbit and almost completely displacing the posterior ethmoids of that side and perhaps extending to the floor of the frontal. In one section we discovered that the sinuses were joined. Or a complete bony partition through the antrum dividing it into an anterior and posterior section may be found. In such cases the posterior cavity has its opening into the posterior ethmoids. In a patient in whom both cavities were filled with pus, the x-ray would show it to be one cavity and thus be of little assistance. But should only

* Read before the Eye, Ear, Nose, and Throat Section of the California Medical Association at the fifty-eighth annual session, May 6-9, 1929.

one cavity be involved, the x-ray would clarify the picture. In suspicious cases it is best to irrigate the sinus and have another exposure, or fill the cavity with lipiodol or other opaque substances.

Perforation of the maxillary sinus is very rare. A swelling occurring in the canine fossa never occurs as the result of infection within, but is due to congenital or an inflammatory cyst.

The infra-temporal wall may be very thin, as is also the infra-orbital wall, and occasionally dehiscences are present so that complications can arise from these two walls as a result of pressure from irrigation or from forcibly removing the membrane from them during the course of an operation. Emphysema of the eye may occur as a result of a sudden blast of sneezing when such a dehiscence is present in the infra-orbital wall.

The ostium may be very small or it may be so large that a cyst the size of a small cherry could be washed out of the antrum. An accessory opening is present in many cases and it usually occurs in the inferior posterior quadrant.

ETHMOIDS

Ethmoid cells may open directly into the infundibulum or may push up behind the frontal sinus to form the bulla frontalis. Here the diagnosis is only made when a radical frontal is done and the bulging wall is seen behind. The cribriform plate may fail to unite with the orbital, thus forming the fovea ethmoidalis which pushes out between the superior wall of the orbit and the inferior wall of the frontal to the extent that it may cover the whole orbit, extending back to the lesser wing of the sphenoid, and as happened in one instance, extending completely around the optic nerve.

The lamina papyracea in some instances is so thin that dehiscences are present; the bone being of tissue-paper thickness and allowing infection from infected ethmoids to pass through the mucous membrane and the thin bone by way of small venules and lymph channels. It is not uncommon, in the course of operation on the ethmoids, to break through the orbital wall. Such an accident may cause serious complications to the eye, although those are not so dangerous as they may appear. The posterior ethmoids may extend back and be reflected over the sphenoid so that their thin lateral walls are in direct contact to the optic nerve, the carotid and cavernous sinus. It is in such cases that complications resulting in a retrobulbar neuritis are liable to occur. Or by infection spreading through small venules into the cavernous sinus, a thrombosis may be the result. Not infrequently a large cell pushes out into the middle turbinate forming the bulla ethmoidalis. Sometimes in removal of the agger nasi, one may come into a specially located infundibular ethmoid cell.

SPHENOIDS

Sphenoid sinuses are usually equal in size, and are separated from the posterior ethmoids by the recessus sphenothmoidalis. They are divided by

a perpendicular partition which is the continuation of the crista galli, but this partition may vary considerably. It may be far to one side or the other so that a large cavity opens into one naris and a very small cavity into the other. Or the sinuses may be divided by horizontal partition, one being above the other, and, as will be seen in one of the slides, the upper sinus, in one instance, opens into the lower sinus by an opening in the partition. In the case of a very small cell on one side it may be completely overlapped by its fellow of the other. Sphenoid sinuses may be so large that they extend as far back as the clevis and anteriorly may so extend that the posterior ethmoids are pushed forward. The average distance from the anterior nasal spine to the posterior sphenoidal wall, is about seven and one-half centimeters, but may vary considerably. When the posterior wall is pushed back to the clevis, the distance may be nine or more centimeters, while if the sphenoid cavity is small and set forward, the distance will be less than seven centimeters. The anterior upper part of the sphenoid wall may be reflected back throwing the upper part of the cavity into the posterior ethmoids. This can only be recognized at the time of operation or afterward when the wound is healed. Pus would still appear upon the face of the sphenoid if only the ethmoid had been entered.

The lateral walls of the sphenoid may be of tissue-paper thickness with the carotid and optic nerve bulging into its cavity. Here, as in the posterior ethmoids, may be found the source of infection and complications to the optic nerve and cavernous sinus.

The lantern slides photographed from actual specimens will show clearly most of these variations that have been discussed.

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DISCUSSION

C. LATIMER CALLANDER, M. D. (450 Sutter Street, San Francisco).—I have read with great interest Doctor Budge's article on anatomical variations of accessory nasal sinuses. A discussion such as this is always timely, especially inasmuch as he joins his anatomic information with points of clinical interest and thus furnishes pegs upon which to hang anatomic knowledge.

His paper is particularly valuable, it seems to me, as indicating the paths along which infection travels which complicates sinus disease. He speaks interestingly of the extraordinary variations in the extent of the ethmoid sinus and he especially stresses the very shallow sinus and the danger of intranasal approach for drainage of this sinus where the anterior cerebral fossa may be damaged. I am interested in the analogy which he draws between the frontal sinus and the anterior ethmoids. The frontal sinus, to me, has always appeared a glorified anterior ethmoid cell and one in which the most extraordinary variations occur with regard to its drainage path into the nose.

The warning that he gives on dehiscences that may occur in the bordering walls of all of the sinuses is a timely one, not only from the point of view of operative damage, but from the possibility of chronic infection involving the adjacent structures. Particularly does this seem to be important in relation to the thin upper and outer wall at the apex of each nasal fossa where the most thorough ethmoid exenteration places the anterior cerebral fossa in danger.

COMPARATIVE BLOOD PRESSURES IN THE TWO ARMS

SOME CLINICAL OBSERVATIONS

By W. E. KAY, M. D.

AND

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OUR attention was first called to the striking variation of the blood pressure between the two arms in the following case.

Mr. G. reported for examination because, to his surprise, he had been rejected by an insurance company on account of high blood pressure. A recent examination by his physician, he said, was normal. The blood pressure in the left arm was found, by us, to be within normal limits, *i. e.*, 130 millimeters of mercury systolic and 80 millimeters diastolic. As an afterthought, to check this finding, the blood pressure in the other arm was taken and found to be 165 millimeters systolic and 90 millimeters diastolic. This was repeatedly checked. On further questioning of the patient we learned that the insurance examiner had taken the pressure in the hypertension arm. Our suspicions were aroused as to the frequency of this occurrence. On consulting the literature we were surprised to find so meager information regarding such an important fact. The majority of statements predisposed, within a few millimeters, that the blood pressures were equal in both arms. The only article we found with direct bearing was Bodenstab,¹ in the *Lancet* of 1925, who described the differences in the readings of the two arms and commented upon the importance of his findings.

The material for this study was obtained from observations upon patients comprising a general medical practice, ranging from a single examination to a series of examinations over a period of a year. Readings were made by the same individual, using a Tyco's sphygmomanometer, in the usual auscultatory manner, palpation also being employed. Observations were successive in the two arms and were made in the sitting or reclining position. They were checked by one of us within a five-minute period.

One hundred and twenty-five patients were studied and five hundred readings were made. Variation of differences of five to ten millimeters in the systolic and diastolic readings were considered within the normal. One hundred cases, or 80 per cent, were within normal limits, while twenty-five cases, or 20 per cent, were distinctly abnormal. All of these were fluoroscoped and many of them radiographically checked.

A brief summary of the abnormal cases is arranged in the accompanying table showing sex, age, diagnosis, blood pressure and, in a few instances, treatment and results.

COMMENT

A study of the table submitted reveals that the arteriosclerotic and hypertensive patients more often show these variations. It is also seen that the greatest differences of blood pressures are found in this class of patients, and especially those with angina pectoris and aortitis. The group which is second in importance are those patients who have vasomotor disturbances, such as occur in the menopause.

In the age column, patients above forty-five years have the most marked variations. In the five younger patients, the differences are not so great. Of these it may be noted that only one has no disease, two have evidences of infection, one has an early arteriosclerosis and one a mucous colitis.

Sex apparently plays no part, since there are about an equal number of males and females.

The right arm is highest in the majority of cases, although we have observed in the same individual that there may be an interchange. In several cases after treatment, such as rest, sedatives, diet, etc., it is seen that the systolic and diastolic pressures drop and tend to equalize in both arms, for example, Cases Nos. 1, 18, 19, 21, 22 and 25. It is interesting to note that some patients equalize in the space of a few minutes without treatment. In these instances recovery from nervousness and excitement incident to the examination, seems to us to be the principal factor.

In a few patients, in the arteriosclerotic group, observed over a prolonged period of time, we found variations were more or less constant, *i. e.*, 9, 20 and 23. Case No. 23 illustrates how equalization and variation may reinterchange at some periods.

The reason for the difference of the systolic and diastolic pressures in the two arms is problematical. The fact that the pressure may later equalize, to again vary, and later again to equalize, and that occasionally a higher pressure may later be found in the arm in which it was formerly lower, rules out fixed anatomical differences as the cause. Rather does it suggest that it is due to varying functional changes in the condition of the arterial walls and, perhaps, of the capillary beds in the two arms.

It is disconcerting to the physician to find a normal reading in one arm and then to discover a high pressure in the other. From a life insurance standpoint these discrepancies are quite significant. A systolic pressure of 130 millimeters and 165 millimeters is, obviously, the difference between a normal and an abnormal blood pressure.

We realize that the number of our readings is comparatively small, but we feel that the occurrence of the differences of blood pressure in the two arms is sufficiently frequent, and of such clinical importance, as to warrant calling attention to it.

TABLE 1.—*Showing Different Blood Pressures in Twenty-five Patients*

Case No.	Sex	Age	Diagnosis	Blood Pressure		Treatment	Blood Pressure	
				Right	Left		Right	Left
1	F	64	Hypertension Arteriosclerosis Menopause symptoms	150/80	180/90	Ovarian Injections	150/80	145/80
2	M	60	Arteriosclerosis Endarteritis obliterans	180/120	160/100			
3	F	50	Arteriosclerosis	165/100	145/90			
4	F	24	Colitis, mucous	135/85	120/90			
5	M	54	Hypertrophied prostate	85/40	110/50			
6	F	45	Menopause Autonomic imbalance	135/80	120/80			
7	M	31	Normal	110/80	125/80			
8	F	54	Postthyroidectomy, residual Menopause	160/110	145/100			
9	M	58	Arteriosclerosis Hemiplegia, residual 9/ 6/28 10/24/28 10/31/28	165/100 142/90 170/100	185/110 140/85 155/90			
10	M	54	Arteriosclerosis Angina pectoris	170/80	150/80	Diet, rest Sedatives	140/80	110/60
11	F	66	Hypertension Arteriosclerosis Aortitis	190/110	175/110			
12	F	66	Arteriosclerosis Myocarditis Hypertension, chronic	200/120	180/120			
13	F	38	Arteriosclerosis, early Aortitis	160/80	140/70			
14	F	51	Arteriosclerosis Menopause	200/120	160/100			
15	M	54	Arteriosclerosis Angina pectoris	140/90	110/80			
16	M	49	Chronic bronchitis Obesity	160/90	174/94			
17	M	18	Intranasal catarrh	148/92	134/78			
18	M	50	Arteriosclerosis Hypertension, chronic Angina pectoris	180/110	145/90	Rest	134/78	134/78
19	M	48	Hypertension Angina pectoris Myocarditis Nervous instability	145/100	165/110	Sedatives 7/14/28 7/21/28 7/27/28	140/90 140/80 140/80	150/90 150/70 140/90
20	F	60	Aortitis Myocarditis Menopause	185/120	165/100	Sedatives 7/21/28 2/28/29	170/95 160/90	155/80 145/80
21	F	55	Arteriosclerosis Myocarditis Glandular dysfunction	150/90	170/110	Sedatives	140/90	140/90
22	M	21	Intranasal catarrh	140/92	128/80	Rest 15 mins.	130/78	124/82
23	M	69	Hypertension Arteriosclerosis Aortitis Cerebral accident 4/28/28 5/28/28 12/ 6/28 2/ 5/29	195/100 160/90 210/100 175/80	170/90 160/90 180/90 175/80			
24	F	57	Arteriosclerosis	200/120	160/100			
25	M	54	Arteriosclerosis Angina pectoris	140/90	110/80	Rest 10 mins.	115/85	110/80

CONCLUSIONS

1. Marked variations of blood pressure readings occur frequently between the two arms, and may be of clinical importance.

2. The incidence of the greatest frequency of these variations is found in arterial diseases and functional vascular changes in individuals above the age of forty-five.

3. We believe the cause of these differences to be varying functional changes occurring in the blood vessels of the two arms.

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REFERENCE

1. Bodenshtab, W. H.: Blood Pressure—Difference of Readings in the Two Arms. *Lancet*, August 1, 1925, 45, 15, 360-361.

ADVANCED TUBERCULOSIS*

PROGRESS IN ITS TREATMENT

By CHARLES E. ATKINSON, M. D.
Banning

DISCUSSION by W. H. Bucher, M. D., Olive View;
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THROUGH the development of newer methods of treatment and by the more intensive and discriminating application of older methods, wider avenues of hope have been opened up for a class of patients to whom formerly we had little to offer, namely, those suffering from advanced tuberculosis and from its common and more serious complications. In what follows, some of the more recent aids in treatment and some complications are discussed.

PROLONGED, INTENSIVE REST

When rest first became appreciated as a remedial agency in tuberculosis, it was usually considered sufficient to have the patient give up work and "take things easy." This limited use of rest undoubtedly saved lives, but was insufficient for the large majority of patients. It then became the rule to prescribe bed rest for all patients whose temperature was above 100 degrees Fahrenheit. This rule was safe, but did not go far enough. As the result of close observation over a period of years, most authorities have become more and more convinced of the great value of rest, and of the great value of a prolonged rest in bed for certain patients for whom formerly rest would not have been prescribed at all. Temperature is still considered a guide of importance, but it is by no means the only guide, and not always a trustworthy guide. Whenever tuberculosis is active, regardless of the presence or absence of temperature, rest is usually advised. In one case this may be because of continued fever; in another, because of rapid heart action (which is often a more accurate guide than the temperature); in another, because of easy fatigue. In still another it may be because repeated physical examinations or serial x-ray studies reveal advancing lesions. It is well known that at the onset of tuberculosis, as well as during relapse, easy fatigue as a sign of activity is frequently noted before fever appears. So, too, when a patient is doing well, some activity of the lesion continues for a considerable time after the fever subsides.

In my own work I am using rest over a much longer period than formerly, and I am convinced not only that this has protected the patient against relapse, but that the number of durable results has been greater. Likewise, for patients who have had repeated periods of improvement, alternating with relapse, at intervals for years, yet who have made no real progress, or on the average have failed, I have found that if systematic rest is continued for months an arrestment of the disease may yet be secured; or, if a complete

arrestment is unobtainable, the patient may be restored to working ability. Often no improvement is noted after several months in bed, but if rest is persisted in over a further period of months, or sometimes years, healing will not rarely be initiated and will often continue. Much patience on the part of the sick person and patience and tact on the part of the doctor are required. In the sanatorium the example of other patients who are progressing favorably is a valuable source of inspiration to patient and doctor alike. In nonresponding cases, without regard to fever, a trial of strict bed rest, with the use of the bedpan, may lead to a reaction in the patient's favor. In especially resistant cases, even in the absence of laryngeal involvement, rest of the voice may be important. If the patient speaks in low tones and only infrequently, this lessens cough, conserves strength, and indirectly promotes healing. A period of absolute silence is worth while in some cases.

During the entire time that the patient is at rest physically, the great importance of mental rest should be kept in mind; for to secure body rest without mental rest is a mistake. The patient should be made as comfortable as possible, and every means that will contribute to peace of mind and mental repose should be employed. Judgment will dictate the particular form of avocation for the individual patient, but for many, the radio, if its use is properly controlled, is a priceless boon as a source of passive amusement or pastime.

POSTURAL REST AND REST ACCESSORIES

In certain cases of unilateral, or mainly unilateral, tuberculosis the patient is encouraged to lie on the worst side a large share of the time. A firm pillow placed under this side aids in securing local rest and brings about a limited amount of compression. A canvas sling connected to a spring suspended above the bed, for making upward pressure, may sometimes be employed to advantage. Some patients gradually accustom themselves to spend as much as twenty, or even more, hours out of the twenty-four in the lateral position. Good results are sufficiently frequent to warrant the more general use of this simple measure. A canvas belt, or chest splint, with or without a contained rubber bag for inflating, is occasionally helpful. The same may be said of weights (which may be made of shot, sewed in a double thickness of canvas), placed on the chest, which restrict the respiratory excursion locally.

THERAPEUTIC PNEUMOTHORAX

In selected cases of tuberculosis, induced pneumothorax has earned a place of prominence. Practically all authorities consider pneumothorax to be one of the greatest advances in the treatment of pulmonary tuberculosis, and even as conservative an authority as Fishberg says that "it is to be considered one of the best therapeutic procedures we have at present for the cure of phthisis."

In giving pneumothorax there is very little risk, and in the class of cases in which it is cus-

* Read before the Riverside County Medical Society, Riverside, January 13, 1930.

tomarily used the risk is inconsequential as compared to the risk without it. The more nearly one-sided the disease the better the prospect, but it is not at all necessary for the disease to be entirely one-sided. One frequently meets with patients who have a widespread, active lesion in one lung, with a smaller lesion, perhaps inactive or healed, in the other. This type of case may often be successfully treated by pneumothorax. Even though an active, advancing lesion is found in the better lung, provided the advance and activity are not extreme, if the general condition is fairly good, pneumothorax may save the day. I have had a number of cases of this type in which the disease in both lungs was satisfactorily controlled.

Increasing experience has led me to believe that it is not well to wait a great while before deciding on pneumothorax treatment. It has been my practice to first give the patient with advanced tuberculosis a thorough trial on rest. In the event of failure, if there appeared a reasonable probability of using pneumothorax successfully, this treatment was inaugurated. I have never had occasion to regret having used pneumothorax, but on several occasions I have regretted not using it sooner. While waiting, the tuberculosis spread to or advanced in the better lung. Even then, in a number of cases the induction of pneumothorax has served to check the disease. In others, induced thus late, it has failed to check the disease, while if used earlier it probably would have done so.

For hemorrhages not otherwise controllable, pneumothorax frequently stops the bleeding promptly. For certain hemorrhages which are otherwise controllable, by quickly cutting short the bleeding, pneumothorax saves the patient a great deal of strength, prevents the anxiety which a prolonged series of hemorrhages entails, and may save life.

In severe acute pleurisy the introduction of a small quantity of air to separate the pleural layers usually promptly relieves pain.

Pneumothorax not infrequently brings about an organizing, obliterating pleurisy. Fluid accumulates, and adhesions form through the fluid. Notwithstanding the use of higher intrapleural pressures during refills, contraction of the adhesions gradually pulls the lung out, precluding further pneumothorax treatment. As a result the tuberculosis may be reactivated. However, if the pneumothorax has previously been carried on over a fairly long period, this organizing and shrinking process is often a favorable termination. The reason seems to be that the organizing process extends from the pleura into the lung parenchyma and leads to the formation of contracting scar tissue which checks the tuberculosis.

SURGICAL PROCEDURES

In occasional cases, when pneumothorax is desirable but impracticable because of adhesions, if the adhesions are few in number, their cauterization by the method of Jacobaeus will render pneumothorax feasible. Again, phrenicectomy

may aid the healing process. Safer than pneumothorax, although ordinarily less efficient, phrenicectomy has a wider field and is to some extent replacing pneumothorax. In certain instances some other form of surgical interference for bringing about pulmonary relaxation or collapse, particularly thoracoplasty, should be considered. Thoracoplasty is a serious undertaking and, for success, it is necessary that the tuberculosis be more nearly one-sided, that the patient be in at least fairly good general condition, and not too old. An evident tendency to scar formation and contraction in the case under consideration greatly increases the likelihood of success. Thoracoplasty is being used more successfully each year and, in the aggregate, has saved many lives.

LIGHT THERAPY

Foreign workers were the pioneers in light therapy, which constitutes a wonderful advance. Artificial light was at first used by Finsen chiefly for skin tuberculosis, and sunlight by Rollier, chiefly for tuberculosis of the bones and glands; but further study has led to the employment of either natural or artificial light in various other types of tuberculosis. For bone tuberculosis, as well as for some other types of the disease, sunlight is preferable, often working real wonders in the rehabilitation of persons who with previous forms of therapy at best would have emerged from the period of treatment greatly handicapped with stiffened joints. For children who are under par, some of whom harbor a more or less latent or but slightly active tuberculosis of the hilar type, light is an agency of no negligible value. Light in some form is also useful for adults who have this type of tuberculosis. For adults suffering from the common type of pulmonary tuberculosis, light often serves as a valuable tonic. Some believe that light therapy has even more definite value in promoting recovery in certain cases of the usual type of pulmonary tuberculosis; but in this field its exact status is not yet established.

When using light it is well to remember that we are dealing with a highly potent agency. The case should be carefully chosen, and insulation carried on very gradually. Light, particularly sunlight, should be looked upon as a remedy as powerful as tuberculin, and if used for pulmonary tuberculosis per se, only afebrile, or relatively afebrile cases with a little or no activity should be insulated. In my experience, light is most advantageously used for seasoning and building up the patient when quiescence of the disease approaches.

ABDOMINAL TUBERCULOSIS

Light is of great value for this complication and has served to revolutionize our ideas as to the curability of intestinal tuberculosis. Either natural or artificial light may be employed, and in this country the workers at Saranac were perhaps the first to advocate the use of quartz light for this complication. My own preference, based on considerable experience with both sunlight and quartz light, with a number of gratifying results,

is for artificial light. Barring contraindication, I advise light baths for all patients who are not doing well if the lung lesion does not seem responsible for the unsatisfactory progress. Statistics have shown that bowel lesions are present in from 70 to 90 per cent of all autopsied cases of advanced tuberculosis, and when the intestinal involvement is minimal, symptoms are frequently almost entirely or wholly absent. I feel that patients whose progress is unsatisfactory without explainable cause should be given the benefit of light therapy. If the lung tuberculosis is particularly active, the chest is covered and only the other parts are exposed.

A special bland dietary and the use of lime, as exemplified by calcium chlorid, intravenously, in the dose of 5 or 10 cubic centimeters of a 5 or 10 per cent solution once or twice weekly, go hand in hand with the light baths. A relatively new measure for intestinal tuberculosis, apparently of definite value, is the administration of cod-liver oil and tomato juice, either fresh or canned.

For tuberculous peritonitis, light therapy is equally effective, and it is my conviction that its more frequent use will obviate many operations. Pneumoperitoneum is a method of promise, and I feel that it has already accomplished a good deal.

LARYNGEAL TUBERCULOSIS

At one time considered fatal, we now know that laryngeal tuberculosis is frequently curable. In the ordinary, slowly progressive form, if the laryngeal and pulmonary processes are not too advanced, the results are often satisfactory. Voice rest (absolute silence, with the use of a writing pad) should be instituted at the outset. Light therapy, as exemplified by reflected, condensed sunlight, when its use is feasible, serves to relieve pain and definitely promotes healing in some cases. Treatment with the galvanocautery gives good results at times, and when the epiglottis is extensively involved, epiglottidectomy often gives prompt relief and may prove curative. The occasional (not too frequent) application of pure trichloroacetic acid to ulcers seems beneficial. The instillation of a 20 per cent solution of chaulmoogra oil in olive oil once or twice weekly makes the patient more comfortable and apparently favors healing.

TUBERCULOUS EMPYEMA

For this complication the closed method of treatment has taken precedence. Fluids on the border line between serofibrinous and pus not infrequently clear of their own accord. Even frank, yellow pus frequently shows no pyogenic organisms, and on the average responds far better to closed methods than to open drainage. Some cases of empyema, particularly those complicating pneumothorax treatment, will yield to repeated aspirations followed by the injection of air.

Purulent fluids which are not controlled by aspiration and air injections may be treated by the introduction of a one per cent formalin-glycerin mixture. If the pus has formed during pneumothorax treatment, as well as in certain other instances, it may be desirable to maintain com-

pression of the lung while treating the empyema. When this is true, air is introduced through a separate needle, simultaneously with the withdrawal of the fluid, or small amounts of air may be entered through the same needle alternately with the withdrawal of small quantities of fluid. The formalin mixture is then injected. During the reaction which follows, fluid may rapidly reaccumulate, causing a pronounced rise of pressure, and this should be borne in mind in deciding upon the amount of air to be injected. Ordinarily one-half as much air, or less, as compared with the quantity of fluid removed, is introduced.

The reaction is often intense, so it is well to inject not more than one-half ounce of the formalin mixture the first time. When the reaction has wholly subsided, usually after a week or two, or longer, the process is repeated. It may be best to then introduce a larger quantity of the formalin mixture, but even in robust patients it is seldom advisable to use more than one or, at most, two ounces of a one per cent mixture. Meanwhile if the fluid again reaccumulates rapidly, it is removed, but no formalin is put in until the reaction again subsides. As the treatments are repeated from time to time, as indicated, the fluid tends to become thinner, less and less purulent, and less and less toxic, while the temperature drops. Sometimes a sanguineous change, which is usually a favorable sign, is noted. In the majority of cases the fluid loses its purulent character entirely, and in some cases finally disappears.

If reëxpansion of the lung is desired, the fluid is first withdrawn through a large trocar, a rubber tube is inserted through the cannula, and the formalin mixture is entered. The tube is connected with a vacuum bottle and suction drainage established. Thereafter, when indicated, small quantities of the formalin mixture are put in through the drainage tube.

As soon as practical, empyema patients are given heliotherapy, which I believe aids in curing the empyema, besides serving as a general tonic.

CONCLUSIONS

Notwithstanding the better results that are nowadays obtained in early tuberculosis, there are still many cases of advanced tuberculosis. The majority of patients who come to health resorts suffer from more or less advanced tuberculosis, so it is a satisfaction to know that we have definite and effective methods of treatment. We can now undertake the care of this class of patients, and treat the more serious complications which arise with a greater feeling of confidence.

205 North First Street.

DISCUSSION

W. H. BUCHER, M. D. (Olive View Sanatorium, Olive View).—Between 65 and 70 per cent of the patients admitted to Olive View Sanatorium are far advanced cases. For these 750 people who are receiving treatment for tuberculosis the main factor is rest.

Physical rest is insisted upon, and can be obtained. Mental rest is sought for, and a social service department makes arrangements in the home so that the father or mother who is lying in bed in the sana-

torium is relieved of the worry consequent upon the illness which has disrupted the family. Psychic rest or relief from emotional stress is even more difficult; but we think there is hope in this direction. Recently we had a trained psychiatrist working with us for a month who delved into some of our problem cases and was able to release the mental barbed hook which was a constant irritant to the patient.

It is not sufficient to put a patient to bed and say rest, more rest, and still more rest. That solves only the physical side; and one may forego the physical rest if mental or psychic rest can be secured. There have been cases within my knowledge where patients with financial worries were allowed to go on part-time work and reached an arrestment probably in shorter time than if compelled to stay abed and fret. The work was in reality a rest as it released the patient from mental stress. Of course, only a few cases come under this classification, but they exist and must be considered. Deeper yet is the psychic stress, and those of us who have the ability to combine with our medical knowledge the power to dislodge a "psychic irritant" will help many patients toward recovery.

Rest is what we want. It is not obtained by merely putting a patient to bed.

We have tried the various postural rest treatments without noticeable results.

More than 10 per cent of our cases find relief, help, and material benefit from pneumothorax: at present there are eighty-eight patients taking this treatment, and it is by far the outstanding procedure on which we can count for definite results.

Thoracoplasty and phrenicectomy have a definite place in the treatment of selected cases. We have done seventeen of the former and twenty-five of the latter.

We use sunlight for our preventorium cases and for bone tuberculosis; not at all for the pulmonary type. We use the lamp for intestinal cases with favorable results, we believe.

In throat cases artificial light is a therapeutic adjunct. In gland cases (neck) the x-ray has been decidedly good.

With all these means at our hands close analysis will focus on the word "rest." Whether by the skill of the psychiatrist, the surgeon's knife, by pneumothorax or simple physical quietness, or by any other means that will immobilize the patient over a period of months or years, good results will come in proportion to the amount of rest we can secure for the patient. The note of hopefulness which Doctor Atkinson sounds in cataloguing these procedures is the one we like to hear, because it tells how we are helping the patient with advanced tuberculosis.

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RALPH C. MATSON, M. D. (516 Medical Arts Building, Portland, Oregon).—The problem of treatment of advanced pulmonary tuberculosis resolves itself chiefly into a question of controlling endogenous reinfection, which is responsible for relapses and extra pulmonary complications such as laryngeal and intestinal tuberculosis. The frequency of reinfection and consequent complications is directly proportionate to the duration of a positive sputum. Consequently our efforts should be directed to measures which will render the patient's sputum tubercle bacilli free in the shortest possible time.

Progress in the treatment of advanced tuberculosis has been quite marked since the advent of artificial pneumothorax and other procedures included under the term "operative collapse therapy." These measures, if successful, shorten the period during which the patient is subjected to endogenous reinfection because of sputum coming from open cavities in the lung. Perhaps the greatest progress in the treatment of tuberculosis and its complications will be made when: first, measures intended to lessen the frequency of lung reinfection and other complications are utilized;

second, when a diagnosis of complications is made early.

Generally speaking, in advanced tuberculosis the longer the patient harbors an open cavity with a positive sputum the greater the danger of endogenous reinfection of the same or contralateral lung, gastro-intestinal tract or throat. It is therefore essential, if the patient is to be benefited from treatment, that sources of reinfection be brought under control.

The adoption of collapse therapy and recognition of the value of such procedures as artificial pneumothorax, intrapleural pneumolysis, phrenicotomy, and thoracoplasty does not rest alone upon their being valuable procedures in the treatment of advanced tuberculosis, but also upon their great importance as a prophylactic procedure in the prevention of endogenous reinfection, which results in the serious complications frequently associated with the advanced stages of the disease.

While many patients who have incipient or moderately advanced pulmonary disease with excavations and cavity formation experience healing of the lung, unfortunately a considerable number later develop an ileocecal tuberculosis from implantation of tubercle bacilli swallowed early in the evolution of their disease. This frequently prevents final recovery.

The patient with a cavernous tuberculosis should not be subjected to prolonged, expectant treatment, as not infrequently the lung disease becomes so widespread that collapse therapy is contraindicated when it is most needed. Utilization of collapse therapy early in cavernous tuberculosis, and the early diagnosis of gastro-intestinal complications will very much reduce the proportion of advanced patients who seek admission to tuberculosis sanatoria today.

Many patients with laryngeal or intestinal tuberculosis have recovered from these serious complications as a direct result of the beneficial influence of artificial pneumothorax, or other surgical collapse procedures.

The early recognition of complications, frequently unsuspected, particularly intestinal tuberculosis, will greatly enhance the patient's chances for recovery. Therefore the presence or absence of laryngeal or intestinal tuberculosis should be determined, if possible, through repeated laryngoscopic or roentgenological examinations during the course of the disease. Too much stress cannot be placed on the value of roentgenological investigation of the gastro-intestinal tract in every patient in whom the slightest suspicion exists as to the involvement of the intestines. The surgical treatment of intestinal tuberculosis has been somewhat retarded because of the fact that heretofore surgical intervention has been too late. Certainly, if we are to accomplish anything in the surgical treatment of intestinal tuberculosis, the diagnosis and surgical attack must be made at a time when the intestinal distribution of disease is very limited.

I feel certain surgical intervention has much to offer the advanced case of pulmonary tuberculosis.

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PHILIP H. PIERSON, M. D. (490 Post Street, San Francisco).—This paper of Doctor Atkinson's and the discussions by Doctors Bucher and Matson are excellent in every detail. I will not reiterate the many good points which all three have brought out.

1. There are four or five points which I think might receive special emphasis; one of the most important is the psychological aspect of treating these patients. The trained psychiatrist is often helpful, but if the physician seeing these advanced patients will train himself to appreciate the many worries which occur to them and show his appreciation by a sufficient discussion of the problems with the patients, their heartiest cooperation may be secured. The advanced patient often requires more time when the visit is made in order to gain the confidence of the patient and give the physician an opportunity to prescribe at least symptomatic treatment, which is often of very great help.

2. The question of the patient lying on the affected side has been mentioned. If the support is placed under this side lessened respiratory motion results, but without it the lower side is opened by the accordion action of the ribs and the patient uses that side more than the upper lung, which is on the smaller convex arc of the two. This little point should always be borne in mind when suggesting postural repose.

3. We are all agreed as to the benefit of artificial pneumothorax and, as has been said, its use before too long a period of waiting will save many lives. The French have used bilateral pneumothorax to advantage in a considerable number of cases. Of course, its technique is more dangerous and it is necessary to have the first side in not too severe a degree of collapse when the other side is started because if spontaneous pneumothorax should result on the second side serious effects might ensue.

4. A further benefit in tuberculous empyema has been the use of five per cent gomenol in either sterile petrolatum or olive oil. In certain instances it has healing influence upon the pleura and when the acuteness of the infection has subsided it may be used to fill the whole thoracic cavity on that side, thereby producing oleothorax.

5. Heliotherapy is of considerable value in treating extra pulmonary tuberculosis, combined with a strict and rigid regimen, but the dangers are so many when used in pulmonary tuberculosis that I feel it should be avoided.

6. Phrenic paresis or evulsion helps to bring about local lung rest in those cases where pneumothorax is impossible and, coupled with thoracoplasty, has certainly offered avenues of hope to many who otherwise would have died. A careful selection of these cases is, needless to say, a most important factor in the obtaining of good results.

ACUTE PULMONARY EDEMA DURING PREGNANCY AND LABOR*

REPORT OF CASES

By HARRY K. BONN, M. D.
Los Angeles

DISCUSSION by W. Clifford McKee, M. D., Los Angeles;
Henry A. Stephenson, M. D., San Francisco; Walter B. Hill, M. D., Long Beach.

PULMONARY edema as a terminal complication of eclamptic cases is fairly common. A pulmonary edema of sudden onset, with a rapidly fatal termination, without convulsions or coma, occurring during pregnancy or after labor has begun, is, however, somewhat rare. Very few cases are recorded in the literature, and many textbooks fail to mention the subject; those that do dismissing it with scant mention.

Edema of the lungs is, of course, to be feared in cases of chronic cardiac disease, and edema or pneumonia may appear during eclampsia, usually with a fatal termination. The type of pulmonary edema under discussion is not related to the terminal phase of an eclampsia, wherein cardiac disease is the prime etiologic factor.

SURVEY OF CASES IN LITERATURE

The writer has been able to find only five recorded cases of acute pulmonary edema, occurring either during pregnancy, during labor, or

shortly after labor had been completed. McIlwraith and Scott¹ reviewed the literature from 1903 to 1918 and could find but a single article, that of Pouliot,² relative to this clinical picture. McIlwraith and Scott in 1918 reported two cases of acute pulmonary edema during pregnancy. Icasalegui³ contributed a report of two cases in 1919, one occurring during labor, the other during the puerperium. Corbin⁴ in 1922 added the report of a case where the edema appeared shortly after labor was completed. He was privileged to see this patient in a later labor with reappearance of the edema.

K. C. McIlwraith and W. A. Scott quote Pouliot, who writes concerning edema of the lungs complicating pregnancy. Pouliot declared that pulmonary edema is one of the most serious complications of pregnant women with cardiac lesions. Symptoms reach a crisis only after the efforts of delivery. This author believes that "the condition is due to the hypertension of the lesser circulation resulting from a very narrow mitral stenosis." He warns especially against the induction of premature labor during an attack, since not infrequently attacks may occur during comparatively good health and before labor.

The possibility of the condition being a manifestation of the toxemia of pregnancy is admitted. E. Centenaro considers all pulmonary complications during pregnancy up to the time labor begins as being due either to the different intoxications (renal or hepatic), or to the infectious diseases or to cardiac pathology.

Albert, aside from the infectious diseases and the various intoxications, says that acute pulmonary edema may be produced by "purely mechanical causes," that is, a spasm or cramp of the ventricles, as described by Grossman and Huchard.

Within the realm of possibility must be considered an embolus or a shower of emboli as causative factors, especially in those cases wherein pulmonary edema has followed shortly after labor has begun or shortly after its completion.

REVIEW OF CASES IN THE LITERATURE

The paucity of reported cases seems to warrant a brief abstract of the reported cases in order to illustrate the various types. McIlwraith and Scott of Toronto report two cases of pulmonary edema of sudden onset and quickly fatal termination, occurring at the sixth and eighth months of pregnancy. These cases were private patients, but were each seen by both McIlwraith and Scott.

REPORT OF CASES

CASE 1.—A primipara of forty-two years of age whose blood pressure was 140 and whose pelvic measurements were normal. The urine was examined every two weeks and was negative. The last menstruation had begun October 4. On March 29, albumin was negative and the systolic pressure was 142. A large amount of albumin and a pressure of 240 was present on April 10, this date being approximately the end of the sixth month of pregnancy. The patient claimed to be feeling in the best of health and was much annoyed when informed that she must go to the hospital at once and not to the theater as she had planned. She did confess to having had a slight head-

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ache for the past two days. There were no eye symptoms or nausea, but slight edema of the feet and ankles was present. Before entering the hospital at 7 p. m., she developed pain under the angle of the right scapula. Five hours after entering the hospital she vomited frothy, bloody fluid, and was in great distress from the extreme dyspnea. Deep cyanosis was present. Both sides of the chest were full of bubbling râles, and bloody fluid was running from both the nose and the mouth. Dullness was present both in front and behind to the levels of the clavicles. The blood pressure was 160. The basilic vein was opened but only a small amount of thick, almost black, blood was obtained. Oxygen was given subcutaneously. The patient died at 3 a. m., three hours after the onset of the edema. Autopsy could not be obtained.

CASE 2.—A II para, age thirty-five. Careful examination failed to reveal any demonstrable cardiac lesion, although attacks of faintness years before had been thought to be due to heart disease. Bimonthly urinalysis failed to show albumin. At the eighth month considerable albumin, granular casts, and many bacilli were found. Systolic pressure was 210 and a slight edema of the feet was present. She was sent to the hospital and the usual measures instituted.

At 7:30 p. m. the patient was sitting up in bed chatting with her husband and feeling quite well. Fifteen minutes later she was seized with sudden coughing and dyspnea and choking. When McIlwraith arrived fifteen minutes later her distress was extreme and marked cyanosis was present. Large bubbling râles were heard on both sides of the chest, the patient being conscious and rational. Venesection was done, sixteen ounces of free flowing blood being removed. Morphia and camphor in oil were given. Three hours after the onset a cesarean was proposed but a skilled anesthetist refused to give an anesthetic. Therefore the membranes were ruptured and she was permitted to breathe oxygen. Her condition improved but she vomited large quantities of clear fluid during the night. However, by 12 noon, extreme dyspnea had reappeared and blood-stained frothy mucus streamed from her nose and mouth. Cesarean section, under gas and local anesthesia, was done at 3:30 p. m., a living child being delivered. The mother's condition did not improve and she died five days after the onset of the pulmonary edema.

CASES 3 and 4.—Icasalegui reports two cases of acute pulmonary edema occurring during labor and in the puerperium. The first case presented the edema during the expulsive period, at which time uterine movements were paralyzed. Forceps were applied, the fetus extracted and, after 350 grams of blood had been withdrawn, the edema subsided.

In the second case the pulmonary edema promptly subsided after withdrawing 400 grams of blood.

CASE 5.—Corbin of Mendoza, Argentine Republic, reports a case of acute pulmonary edema occurring after the conclusion of labor. The patient was twenty-four years of age, para II. The first labor had been normal. During the second pregnancy no disease of the heart, the kidneys, or other organs had been found. The second labor resulted in a spontaneous delivery and, about ten minutes after the placenta had been expelled, acute pulmonary edema appeared with the customary symptoms and physical findings. Morphin was administered and turpentine stupes applied to the chest and back. After coughing up blood-stained fluid for two or three hours, the fluid became rose-colored and finally clear. The lung findings disappeared and the patient was up and about in ten days.

Corbin first saw this patient in September 1915, and examined her frequently in the next five years. No cardiac, renal, or other pathology could be found.

In July 1920 the patient consulted him, as she was about three months pregnant. Corbin feared a recurrence of the pulmonary edema and sent her to several eminent colleagues in Buenos Ayres for consultation. All were agreed that the patient was perfectly healthy and laughed at the idea of future attacks of pulmonary edema. The patient had a persistent and very great fear of an attack and insisted that she would die in her labor.

In November she had an attack of edema lasting two hours, relief being secured with morphin. The question of inducing premature labor was discussed, but the morphin had so quickly relieved the condition that it was decided to wait. An x-ray of the chest was taken and pronounced normal. On December 12 two more attacks occurred of two hours' duration, relieved by the same treatment. On December 14 another attack occurred and again relief was secured.

Blood pressure was 110, the urine normal on December 21. Every four or five days she would have a two-hour attack of pulmonary edema, always coughing and expelling bloody and frothy fluid, and always relieved by morphin. On January 2, 1921, an attack began about midnight; morphin, stupes, oxygen, and all other measures were without avail, and the patient gradually became worse and died at 6 a. m., six hours after the attack began. An autopsy was not permitted.

REPORT OF CASE BY AUTHOR

My personal case was referred to me by Dr. G. D. Conover, to whom I am indebted for the history and physical findings.

CASE REPORT.—Mrs. D. M., age twenty-two, married two years, primipara. So far as she knew she had never been ill nor had she ever consulted a physician. She had been an orphan since she was four years old.

The patient was examined by a physician in a near-by city who assured her all was well. She later moved to Los Angeles and consulted Doctor Conover January 21, 1926. Menstruation first appeared at thirteen years of age, was of the twenty-eight day type without any pain. Her last menstruation began May 31, 1925, and lasted three days. Quickening occurred October 30, 1925, according to the patient. The estimated date of labor was about March 10, 1926. The patient was five feet three inches in height, stockily built, weighing 135 against a norm of 130. No cardiac pathology could be found and the lungs were clear and free from râles. There was no abnormal thyroid enlargement. Blood pressure was 130/80; pulse 80, of good volume. No toxic symptoms were noted. The fetal heart sound was located in the right, lower quadrant, rate 130. No external pelvic measurements were made, but vaginal examination indicated an ample pelvis. The perineum was intact and the cervix soft. The urine was negative for albumin.

On February 2, blood pressure was 130/85; pulse was 80; urine was negative for albumin. No toxic symptoms were present. On February 9, pressure was 130/90, and slight edema of right foot and leg was present and a trace of albumin was found in the urine. On February 10, pressure was 135/85; urine was negative for albumin. Edema of the leg had disappeared. On February 17, pressure was 130/80; trace of albumin was found again in the urine; edema of right foot was present. On February 24, pressure was 135/85; albumin had disappeared, but right foot was edematous. On March 1, pressure was 130/90; patient felt well, no albumin was present in urine, and the edema had disappeared. No headache or eye signs were noted during this time.

On the morning of March 3, 1926, she had a few cramplike pains and, believing herself to be in labor, entered a maternity home. About 11:30 a. m. she had a rather severe pain and the amniotic sac ruptured, considerable fluid being lost. Within a few minutes frothy, blood-stained fluid began to pour from both the nose and mouth. She was deeply cyanosed—face,

lips, and nails; was unable to lie down and dyspnea was extreme. Doctor Conover saw her at 12 noon. I saw her at 12:30 p. m. The picture was unchanged. She was sent to the hospital, sitting upright in the ambulance since it was impossible for her to lie down because of extreme dyspnea.

On hospital entrance, temperature was 98 degrees; pulse, 130 to 145; respirations, 36 to 45. The blood-stained fluid streamed from her nostrils and mouth, and she was unable to lie flat. She was placed in an exaggerated Fowler position. It appeared that each minute would be her last. Blood pressure was 164/110. Nausea was present. She had been given morphia, one-fourth grain, before being moved to the hospital, with almost complete cessation of her labor pains. Between 2 and 6 p. m. she received digitalis, morphin and atropin at different times. She was extremely restless, turning from side to side and sitting bolt upright in the bed most of the time.

At 6 p. m. she seemed in a little better condition; at least at this time she could lie almost flat in the bed. Notes on a consultation with an obstetrician, Dr. M. H. Ross, were as follows: "Having irregular uterine contractions every five to ten minutes apart, lasting from ten to thirty seconds. Bubbling râles in chest, as heretofore noted. Expectoring blood-stained fluid; likewise identical fluid streaming from nose. Right heart dilated; pulse 135, irregular and of soft quality. Blood pressure was 124/80. Marked cyanosis and marked dyspnea. Opinion: Pregnant in labor at term; dry labor; dilated right heart; acute pulmonary edema. Fetal heart tones very weak, but believe child alive. Rectal examination shows about one finger dilatation. Concur in advisability of immediate cesarean section under local anesthesia."

Accordingly a cesarean section was done at once under one-half of one per cent novocain anesthesia, a dead child being delivered.

Section was not especially difficult although it was necessary to keep the patient in a modified Fowler position during the operation. She was returned to bed in about the same condition as before operation, pulse 120, respiration 40. The blood-stained fluid continued to pour from her nose and mouth.

At 10:30 p. m. of the day of the operation, a catheterized specimen showed 1016, acid, cloudy, yellow, measurable albumin, sugar negative, indican, acetone and diacetic acid one plus, numerous hyaline casts, fine and coarse granular casts, and a few pus and red blood cells.

At 4 a. m., temperature was 103.2; pulse, 140; respiration, 40. Three hours later the patient gave two gasps and died. Autopsy could not be obtained.

COMMENT

The salient points as regards the two cases of McIlwraith and Scott were: pulmonary edema of sudden onset occurring at the sixth and eighth months of pregnancy, the outstanding feature being a tremendously high blood pressure. Apart from the urinary findings, little else could be discovered before the onset of the acute symptoms. In the second case there was considerable edema of the feet. A preëxisting cardiac lesion was not found in either case.

McIlwraith and Scott do not consider that their cases can be considered eclamptic because these patients did not have convulsions, which they consider essential for eclampsia. Nor did these patients die in coma without convulsions, which some observers consider sufficient to classify the case as eclamptic. Hence McIlwraith and Scott consider that this condition of pulmonary edema is due "to a profound toxemia giving rise to a high blood pressure which finds its outlet in a

spot of weakened resistance in the lung." They further remark that the blood pressure is the best indicator of the severity of a preëclamptic toxemia and that the possibility of pulmonary edema must be considered in those cases presenting albuminuria and high blood pressure.

In the cases of Icasalegui the cause of the pulmonary edema was neither in the lung nor heart nor kidneys. His second case presented arterial hypertension as shown by the sphygmomanometer. The original article of Icasalegui is not obtainable and the meager data of his two cases were taken from an abstract of a prior abstract.

Corbin believes that the cause of the pulmonary edema in his case was "spasm of the left ventricle" (Huchard). He states it could not have been due to intoxication, since careful examination of the heart, kidneys, and other organs failed to show disease and also morphin cured the patient in several attacks, which would not have occurred had intoxication been the cause.

The case herewith reported did not present a blood pressure extraordinarily high and the albuminuria and edema of the feet were of a transitory type. The prompt appearance of the acute pulmonary edema, after the amniotic sac ruptured, suggests a causal relationship perhaps, as regards either an embolus or a shower of emboli. The cause of the edema may have been a spasm of the ventricle as suggested by Huchard and Corbin. I do not feel that the eclamptic state was responsible. It is to be much regretted that an autopsy was not obtained in any of the four cases dying of this disease.

As regards treatment, Corbin insists that morphin should relieve the edema promptly if no intoxications, renal or hepatic, especially are present. Icasalegui, on the other hand, states that the only valid treatment of acute pulmonary edema, whatever its cause, is a general blood letting to the extent of 300 or 400 grams. Blood withdrawals, according to Ballard, of a medium grade of 500 grams produce an immediate and lasting fall of the arterial pressure in elevated hypertension of the renal type, as well as a diminution of the work of the cardiac muscle, shown by the immediate reduction of tension. The amount of the fall of arterial pressure does not depend on the quantity of blood withdrawn and the effect continues for several days.

SUMMARY

Acute pulmonary edema carries a high mortality during pregnancy, this mortality increasing as term is approached and likely reaching its peak during labor. Seven reported instances (six patients) of acute pulmonary edema occurring during pregnancy, labor, or the puerperium are cited. There were four deaths, one at the sixth and one at the eighth months of pregnancy, one very near to term, and one during the first stage of labor. Of the three patients surviving the edema, one occurred during the expulsive stage

of labor, the other two during the puerperium. The comparative rarity of acute pulmonary edema during pregnancy, labor, and the puerperium accounts for the extremely small number of reported cases.

The following premises seem logical. A patient who has survived a previous attack of acute pulmonary edema occurring during pregnancy, labor, or the puerperium, and who has again become pregnant is entitled to a therapeutic abortion. A tubal sterilization at the time of the abortion or later, as circumstances dictate, is also indicated. The choice of either the abdominal or vaginal routes for the performance of the tubal sterilization is a matter of personal preference.

When acute pulmonary edema occurs during pregnancy or labor and the blood pressure is not unduly high, morphin is indicated. Under like conditions but with a high blood pressure, venesection is to be done. With either of the preceding conditions present, at the first sign of improvement, slight though it may be, the uterus should be emptied.

For those cases near term or in labor, the procedure of choice is a classic cesarean section under local anesthesia, performed at the slightest evidence of improvement in the patient's condition, and at the latest, not longer than four to six hours after the onset of the edema. It is questionable whether any delay is justifiable in these cases. Delay in emptying the uterus certainly minimizes the chances of securing a living babe and the possibility of the mother's recovery.

520 West Seventh Street.

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DISCUSSION

W. CLIFFORD MCKEE, M. D. (1930 Wilshire Boulevard, Los Angeles).—Doctor Bonn is to be congratulated upon his presentation of such an interesting obstetrical complication. I have not had the opportunity of seeing a patient who has had acute pulmonary edema except with a coexisting toxemia:

Any pulmonary disease carries with it a serious import during the pregnant or the puerperal state. When pulmonary edema appears, either with a toxemia or independent of it, the condition is of almost fatal consequences.

Generally speaking, one presupposes cardiac failure when acute pulmonary edema develops. In the absence of cardiac disease it is usually thought to be due to a toxemia affecting the heart or possibly the pulmonary circulation. This need not be an eclampsia but some other toxemia that does not fit the usual picture. It is conceivable that a localized allergic reaction could be responsible, for it has been demonstrated that placental fragments are found in the lungs of pregnant women.

In reviewing Doctor Bonn's reputed cases, one is impressed by the fact that some of these presented evidences of a toxemia; could it not be possible that all of them were dependent upon some type of toxemia, for it is possible for eclampsia to develop with

but little of the usual evidence. Doctor Bonn's personal case did show some albumin and edema, and it is possible that a toxemia was present. It would have been interesting to have had electrocardiographic studies of the case as well as blood chemistry findings. They might have thrown some light upon the condition.

The patients that I have seen with acute pulmonary edema were those who had an eclampsia. My experience has been that the best results were obtained with the intravenous use of strophanthus and atropin or adrenalin. If the patient was restless, morphin was also given.

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HENRY A. STEPHENSON, M. D. (490 Post Street, San Francisco).—One concludes from Doctor Bonn's article that acute pulmonary edema is a very rare condition since only six cases have been reported. Indeed most obstetricians have never seen the condition except perhaps as a terminal finding in patients dying from toxemia. Osler mentions the fact that there are cases of recurring attacks of pulmonary edema without obvious cause. Corbin's case seems to fall in this group.

Welch advanced the theory that the edema is the result of transudation from the lung capillaries due to disproportionate weakness of the left ventricle. Cardiac failure, then, should account for the majority of cases, though the exact lesion is not always demonstrable.

I have seen only one case of pulmonary edema not associated with demonstrable toxemia. This was in a primipara who had a short labor terminated by low forceps for fetal heart irregularity under ether anesthesia, which was taken poorly. Twelve hours later acute pulmonary edema ensued and, in spite of atropin, morphin, and blood letting, went on to a fatal termination. No autopsy was obtained, therefore an incipient postanesthetic pneumonia cannot be ruled out.

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WALTER B. HILL, M. D. (420 Cedar Avenue, Long Beach).—I have during the past two years had but two cases of pulmonary edema complicating pregnancy. A short presentation of these cases follows:

CASE 1.—Mrs. C. G., age thirty-one, white. Working diagnosis: Parturition normal, R. O. P., with hypertension and albuminuria. (Doctors Fred Clarke and Frank Settle were with me on this case.) This patient entered the hospital by ambulance at 6 p. m. October 28, 1928. She had a grave toxemia of pregnancy, complicated with a pulmonary edema. She was a German girl, weighing 158 pounds, a primipara, thirty-one years of age. Her blood pressure was 200/130 when she entered the hospital. She was given one-sixth grain of morphin, followed in twenty minutes by another one-sixth and one-seventieth grain of atropin. A cesarean section was performed within an hour.

Following the cesarean, blood pressure was 160/100. Pulse rate remained about 100. Within twenty-four hours her nitrogen was normal and the albumin, which was marked on entrance to the hospital, was markedly less, and there were few casts. The babe delivered was a five and one-half pound girl in very fair condition.

On November 16, 1928, the patient left the hospital by ambulance. She had progressed beyond expectation. Pulse rate was 100; blood count was improved; and N. P. N. was normal. All medication was discontinued following the delivery and routine obstetrical care was given this patient. The babe was on a formula from the beginning.

CASE 2.—Mrs. L. J. Patient was a primipara, weighing 141 pounds, and was sixty-four inches in height. Age, thirty-two years. She had a history of former acute tuberculous infection of the chest. She had a mitral stenosis, and a rather marked tachycardia. Her hemoglobin was 50 per cent, her red count 3,000,000, and her leukocytes 11,800. She had a trace of albumin in her urine, but no casts.

Patient entered the hospital in active labor at 4 p. m., December 18, 1929. There were no symptoms of oncoming edema at first. At 9 a. m., on the 19th, the patient began to expectorate bloody sputum and to vomit a frothy, bloody fluid, and rapidly became cyanotic and in great distress from extreme dyspnea.

Dr. Fred Clarke was called in consultation. Both sides of the chest were filled with bubbling râles and the patient appeared in a desperate condition. At this time she had progressed fairly well in labor, the head being in the low midplane, and cervix was dilated about three fingers. She was given oxygen and a quick forceps delivery was done.

This patient was given morphin grains 1/6 and atropin grains 1/100 at onset of the pulmonary edema, and following delivery a digifolin ampoule was given every four hours, and atropin grain 1/75 twice during the forenoon. After twenty-four hours, tincture of digitalis minims 15 was given every six hours. Patient remained medically under Doctor Clarke's care for weeks following her delivery. Her babe was in good condition and was at once put on the bottle.

I believe that these cases should be treated with morphin, atropin, and digitalis, and that the uterus should be emptied just as soon as possible. They are, fortunately, rare but always seriously grave cases.

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DOCTOR BONN (Closing).—I have discussed the subject of pulmonary edema during pregnancy with several colleagues and their remarks are reiterated here. Souther of Cincinnati has suggested the use of adrenalin chlorid, but the dose is one drop in saline solution every five minutes until either a beneficial effect is observed or until a maximum of fifteen drops in all has been given.

Arnold Schwyzer of St. Paul has observed one case in which an attack occurred during the first pregnancy and again during a second pregnancy, the patient surviving a further attack during the delivery. Schwyzer states that he regards pulmonary edema as an angioneurotic condition and that it is quite likely due to some form of toxemia.

Kerwin of St. Louis has seen two cases in which neither cardiac disease nor toxemia was present, both recovering. He was fortunate in securing an x-ray of the chest during the attack in one case, and it may be of interest to note that the roentgenologist reported an increase in the peribronchial markings, especially in the hilus region over the lower lobe. The markings did not extend into the apices, and were considered an important point in the diagnosis of edema.

Edmund Andrews of Chicago, while studying alkalosis through experimental work on dogs, found that a dose of alkali that would not affect a normal dog would produce almost fatal edema of the lung, with coughing up of mucus, in a dog with acidosis. Andrews quotes this occurrence, which was deliberately repeated after its accidental finding, as a possibility in some of these acute pulmonary edemas in the later stages of pregnancy. He suggests that the mechanism may be possibly as follows: Under alkalosis there is a more or less dilution of the blood. When that amount of filtrate combined with the protein in the blood vessels is suddenly freed from its chemical state by alkalization, it has to make its way into the tissues by some mechanism, and the lungs are likely the available mechanism. It makes its way into the alveoli and is coughed up.

I do not possess sufficient ability to paint the dramatic picture of pulmonary edema, but a novelistic description of the attack and death from pulmonary edema is to be found in Emile Zola's *Fecondite*.

ESTHETIC PLASTIC SURGERY

By H. O. BAMES, M. D.
Los Angeles

DISCUSSION by George Warren Pierce, M. D., San Francisco; Howard L. Updegraff, M. D., Hollywood; William S. Kiskadden, M. D., Los Angeles.

GOOD looks are an asset of high economic value. In the modern business world, attractive personal appearance may rank equal or even higher than specialized ability. Marred or otherwise unattractive features represent a serious handicap. The striving for enhancement or maintenance of good looks is therefore evidence, not of an idle cult of beauty, but rather of a serious determination, born of necessity, to let no remedial defect stand between success and failure in the struggle for existence. Legitimate demand for this work being thus proved, the problem arises as to who is to meet the request for work of this kind.

It is a time-honored tradition of surgery that its one and only mission be the conservation of life or the restoration of function, with the paramount concern of securing this result in the shortest possible time. Of late, however, another factor has entered the equation, particularly in operating on exposed parts of the body, and judging by the present trend of dress, the field of observation is decidedly increasing. A blemish on the body may have a disturbing influence on the peace of mind of the individual and hence entitles the patient to relief. This holds good whether the blemish be congenital, acquired accidentally, or resulting from surgical intervention.

TWO TYPES OF PLASTIC SURGERY

Plastic surgery may be divided into two branches. The first type is reconstructive and has for its prime object restoration of function and only secondarily, restoration of appearance. It deals with gross deformities and involves all the elements of major surgery in its risks as well as technique.

The second type is esthetic plastic surgery, which has to do with correction of imperfection in figure and features and the creation of normalcy in respect to symmetry of contour and harmony of proportions. Its surgical problems are really minor ones. We frequently hear the expression "a good cosmetic result" when we really mean esthetic, for cosmetic refers to color and complexion only; things which may be purchased in the drug store or at the beauty shop, but not in the operating room.

QUALIFICATIONS REQUIRED FOR ESTHETIC PLASTIC SURGERY

1. Artistic talent, so that defects may be properly evaluated.
2. Sculptural ability that features may be harmoniously blended, a sense of proportion being of greater value than the measuring rod.
3. Adequate training in anatomy so that the contemplated alteration may be physiologically sound and functional.

4. A specialized surgical technique having as its most important object that the intervention leave no scar.

HOW MAY SURGICAL SCARS BE RENDERED INVISIBLE?

A. By hiding the incision, placing it within areas normally covered by hair or within orificial surfaces.

B. By blending the incision with normal lines and folds of the skin, paralleling its grain or lines of muscular tension.

C. By following carefully a technique of wound treatment which has as its most important object that it leave no trace, the detailed steps of which are as follows:

Incision.—The incision is vertical through the skin, as this allows for the evenest coaptation of the skin edges; a slanting incision will frequently cause overriding with resulting humpy elevations on what should be a perfectly smooth surface.

Methods of Suturing.—All tension must be carried by the fascia, none whatever by the skin. In a long straight wound a buttonhole or a subcuticular suture will be satisfactory; in an irregular wound only interrupted suture will give good results. The sutures must be tied loosely that an occasional swelling may not cause it to cut through the skin. Sutures should not be as close together as possible, but as far apart as will still secure close coaptation.

Suture Material.—For the fascia, catgut, in strength and thickness proportionate to the density of the fascia it has to unite; for the skin, horsehair, dermal or similar product, the finer the better. Metallic clips are only satisfactory where the skin is thin and its edges easily raised.

Needles.—Noncutting for the fascia; cutting for the skin; the smaller and sharper the better.

Dressing.—A wet dressing with any mild antiseptic solution will most satisfactorily prevent serum accumulation and crust formation in the wound; after twenty-four hours, a dry dressing. There must be suitable fixation and splinting that the newly created shape may be properly safeguarded while healing takes place. A fair amount of pressure is necessary to prevent venous stasis and congestion.

Removal of the Sutures.—Sometimes we find a wound healed so perfectly that barely a line is visible, but bordering this narrow line is a double row of stitch marks, worse in appearance than a scar could be. In such a case the stitches were left in too long or were tied too tightly. When there is no tension on the skin and the skin sutures merely serve to secure an even coaptation of the margin of the wound, it is remarkable how quickly the sutures may be removed; in the eyelids, in twenty-four hours; nose, forty-eight hours; other parts of the face and neck, seventy-two hours.

ESTHETIC PLASTIC SURGERY OF THE FACE

Anesthesia is practically always by local infiltration of one per cent novocain with adrenalin

ten minims to the ounce. Adrenalin helps somewhat in hemostasis; effective control, however, is best obtained by pressure—this may be with a gauze sponge held in place for a few seconds or with a hemostat forceps; ligation is hardly ever needed. In wounds where bacterial control is only relative, catgut had much better be not introduced.

Absolute asepsis must be aimed at in reconstructive surgery, but such rigid procedure is seldom necessary in esthetic surgery. Where the hair is apt to interfere, it is clipped short and the area disinfected with two per cent tincture of iodine. All the rest of the face, including the inside of the mouth and nose, is satisfactorily prepared by being scrubbed with a gauze sponge soaked in a mild solution of antiseptic, my personal preference being potassium mercuric iodid, which is noncorrosive to instruments and well tolerated by the skin.

Alterations in the Shape of the Nose.—These never require any external incision. An incision is made through the septum, between the columella and the septal cartilage. By blunt dissection, the skin over the septum and over the nasal bones is undermined. If a hump is to be removed, this entrance will readily allow it to be removed with a chisel, the raw edges of the bone being made smooth by rasping. If the object is to raise the bridge of the nose, a piece of cartilage from the eighth rib can be satisfactorily introduced. If the nose is to be shortened and the tip elevated, a suitable section of the lower border of the septum is removed. Shortening of the soft parts is accomplished by extending this same incision laterally between the upper and lower lateral cartilages and freeing all the skin from the cartilage and bone. Pushing the tip up, we now find projecting into view the lower edge of the upper lateral cartilages. We trim away that amount which we find superfluous and hold up the tip of the nose by a strip of adhesive extending from the tip to well upon the forehead.

A mold made of stent, held in place by adhesive, will satisfactorily maintain the newly created shape. No sutures are necessary except perhaps in lining up the mucous membrane edges along the columella. Within three days, all dressing may be dispensed with. There is no packing or dressing in the nose, but it is cleansed several times a day with a mild antiseptic solution.

Ears.—Unduly prominent ears are not considered desirable features and frequently demand correction. This is best accomplished, not by cutting down the size of the lobe, but rather by laying it closer to the head. An elliptic piece of skin in back of the lobe and the adjacent area over the temporal bone is removed and the new skin edges sutured together. Where the spring of the cartilage makes the ear stand out too much at right angles, closer apposition to the head is frequently obtained more desirably by rotating the lobe forward or backward as may seem indicated, rather than by removing a piece of cartilage. Compression bandage for a week is advisable to take all tension off the stitches.

Scars of Age.—Operations to restore or maintain youthful appearance should amount practically only to the removal of redundant skin from the eyelids, chin and areas immediately adjacent to the lobe of the ear. So-called face-lifting operations should in no way involve any lifting of the muscles of expression, but should depend upon the tensing and smoothing of the skin overlying the muscles.

If the tension is placed on the fascia, the result may be more or less satisfactory and lasting. If the tension is on the skin, a good effect is rather transitory and greatly marred by a tendency to scar formation.

Eyes.—Bagginess around the eyes and crows-feet represent superfluous skin which has lost some of its elasticity; excision is simple, healing scarfree. In the upper lid, the incision line is placed where the lid doubles back on itself in opening the eyes; in the lower lid, it is placed directly under the lashes. A wet dressing for twenty-four hours is desirable; no further dressing is needed thereafter.

Warts, Moles, Birthmarks, Smallpox Pits, Acne Scars.—In the past these have received scant attention. Whether electrolysis, fulguration or excision should be employed, only the experience of the operator may decide. For smallpox pits, acne scars, and nevi, no remedy can approach the results which can be obtained by carbon dioxide snow repeatedly applied in slush form.

Scars.—Facial disfigurement frequently follows automobile accidents, flying glass being the chief factor; the wounds are deep, ragged, and seldom thoroughly cleanable. A wet dressing for twenty-four hours, leaving the wounds to be thoroughly drained, and repairing the next day will give much better alignment, less swelling, less danger of infection and less likelihood of oil, grease, or other material being retained in the wound, which later show up as most undesirable discoloration. In the case of old scars, excision and repair under the previously outlined technique, gives the best result. No defect of contour should ever be filled with paraffin in any form, as within a few years large disfiguring bumps grow around the injected material. Implantation of fat, fascia, or cartilage is the sovereign remedy.

ESTHETIC SURGERY OF THE BODY

Esthetic surgery of the body can only be performed under general anesthesia and requires observance of the rules of asepsis applicable to major surgery.

The shape of the body, referred to by the female sex more particularly as the "figure," may be quite satisfactory to its owner in all respects except for some localized area of abnormality.

The Bust.—The mammary glands may be rather large and grossly at variance with normal standards, or they may be merely pendulous, amounting, however, practically to dislocation of the organ. Re-position to normal can only be obtained by removing the excess fatty tissue, remov-

ing also the abnormal amount of glandular tissue, shortening the pedicle by plication, and transferring the gland back to its normal anatomical bed. The procedure which accomplishes this most satisfactorily may be stated as follows: With the patient in the upright position, the normal anatomical bed is outlined and suitably marked. In the center of this area a round section of skin corresponding in size to the nipple and surrounding areola is excised. The areola is circum-incised and the attachment of the gland from the skin in the old bed, as well as the new, is severed by blunt dissection with a hot towel. The gland, with its attached nipple, is transposed upward, the nipple is made to emerge through its new opening; the base of the gland is adequately secured with catgut and the loose amount of skin constituting the former bed of the gland is trimmed away in a line paralleling the lower circumference of the gland in its new location. Thus the only scar lines are rendered almost invisible, as the smaller incision blends with the outer margin of the areola and the lower with the lower margin of the curvature of the breast. Blood supply, nerve supply, and lactic ducts are not in any way disturbed by this procedure. As all subcutaneous dissection is with the hot towel only, the operation is practically bloodless. Excessive glandular tissue is removed in one or more sectors, whichever procedure may give the most normal shape to the gland. The sides of the sectors are united with catgut. Drainage for two days is desirable.

Abdomen, Hips, Thighs.—Regional lipomatosis of the abdomen, hips, or thighs constitutes another factor which may require attention on esthetic grounds. There is no other remedy except surgery, but very definitely be it said that surgery is never justified in general obesity.

Of utmost importance is the designing and marking of the contemplated change; the sculptor's rather than the surgeon's viewpoint should govern in designing. The patient must be in the upright position and the surgeon should thoroughly familiarize himself with the changes in contour brought about by changing from the upright to the recumbent posture, which obtains during operation. After the skin is incised, all further dissection is with the hot towel and extends clean to the aponeurosis of the muscles. Where lateral undermining is needed to remove more fat, approximately half an inch of fat should be left adherent to the skin, otherwise that area of skin will look dry and shriveled. Drainage to control serous oozing is very important, as firm compression cannot always be satisfactorily maintained; short pieces of rubber tissue through the sutures down to the aponeurosis, placed about four inches apart, have been found most satisfactory.

Closure of the wound is by a continuous buttonhole dermal suture; fairly deep bites are

taken to prevent dead space; as fat is slow in forming a solid union, these sutures are left in place for two weeks; stitch marks in these ordinarily unexposed areas being not considered of consequence compared with the more desirable contour gained by the operation.

Recurrence is practically impossible if all the fat, clear down to the fascia, is removed; shock is very minor, in spite of the frequently very extensive resections.

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DISCUSSION

GEORGE WARREN PIERCE, M. D. (490 Post Street, San Francisco).—Doctor Bames' paper is a timely one. The public today demands this type of surgery from both the social and economic viewpoints. The pseudo-specialist and the advertising charlatan have been quick to offer a dubious service, with the result that this type of surgery has received considerable discredit from too frequent unfortunate results. It is incumbent on the medical profession to meet the demand with properly trained specialists. This type of work calls for exactness of technique and mature judgment. No mistakes can be made, lest they become a lasting monument to inefficiency.

It is interesting to note almost a change of character which often comes to patients after the correction of a facial deformity, such as a deformed nose; increased attention to personal appearance and dress, an infusion of confidence evident in bearing, and a losing of sensitiveness which sometimes amounts to an inferiority complex. It has been my observation that patients are more sensitive of deformities of the nose than of any other feature of the face.

Doctor Bames' outline of technique is of interest. While each surgeon may vary his method, the basic principles must be the same. I find, however, that my results have been better in fresh wounds of the face as occur after automobile accidents, if complete debridement is done as soon as possible and primary suture with small silkworm-gut drains is used.

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HOWARD L. UPDEGRAFF, M. D. (6777 Hollywood Boulevard, Hollywood).—I am glad to see that Doctor Bames draws a distinction between reconstructive and esthetic plastic surgery. There is a very definite place for esthetic plastic surgery. Most of the specialties began, so to speak, in most humble manner. It might almost be said that the surgeon of today was the barber of yesteryear; the obstetrician was the midwife; the genito-urinary specialist the venereal disease exponent, who even today advertises in the public comfort stations in England. The radiologist is still within our memory the experimenter of the 1890's, while the physiotherapist is trying to shake himself loose from the pathists who are cashing in on his stock in trade. Oculists were preceded by men who vended spectacles, the neurologists drove out the devils of a disordered mind, and so on with all the specialties until none of us, if we are inclined to be genealogical, but see a professional family tree of which we speak little; that is, if we would go back and point out some of the more unfavorable beginnings.

Doctor Bames, in his paper, has shown courage in advocating "face-shifting" and "contour correction," surgical procedures which have at the hands of inexperienced operators aroused much grief. I have not found metal clips or delayed repair following trauma of advantage. Doctor Bames stressed an important fact in the avoidance of catgut in repair where there

is a possibility of infection. Also one of the secrets of nonscarring is the use of compression rather than sutures to control skin hemorrhage.

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WILLIAM S. KISKADDEN, M. D. (803 Wilshire Medical Building, Los Angeles).—I desire to endorse what has been brought out both in Doctor Bames' paper and in the discussion, regarding the present status of plastic surgery. Unfortunately the free use of the phrase "plastic surgery" by charlatans and beauty parlors has brought to this new and important specialty an undeserved association with quackery.

Doctor Bames has wisely pointed out the importance of avoiding skin tension. We know that it is certainly one of the most prominent predisposing factors in keloid formation. In the secondary repair of old scars adequate undermining of the skin will often permit closure of large raw areas without tension. If keloid formation is feared or has previously occurred, the use of fractional skin doses of x-ray, with accompanying compensating lapses of time will be found of value. This treatment should, however, be instituted early.

I would like to stress the value of light dressings that allow diffusions of air through them and to the wound. The trauma of operative procedure may frequently irritate skin edges and if a thick dressing is reinforced by adhesive, the tendency for bacterial incubation in a warm, moist medium is greatly enhanced. In harelip surgery, where the baby's hands are restrained, we dispense with all dressings and apply only a thin coating of yellow oxid of mercury.

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DOCTOR BAMES (Closing).—The discussion brought out two points:

1. An endorsement of the contention that operations and wound treatment should receive consideration from the esthetic as well as the surgical viewpoint.
2. That there is a difference of opinion on methods of getting results which meet both requirements.

It is evident that an interchange of experiences in this field is decidedly apropos. If this paper succeeds in arousing such action, it will have more than served its purpose.

INFECTIONS OF THE ETHMOID LABYRINTH*

By FERRIS ARNOLD, M. D.
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DISCUSSION by F. H. Linthicum, M. D., Los Angeles;
Isaac H. Jones, M. D., Los Angeles.

SOME of the most interesting problems found in the field of otolaryngology are those associated with pathologic changes of the ethmoid labyrinth. Great diversity of opinion exists as to what constitutes the proper interpretation of the findings and the treatment of those conditions. One must learn to evaluate properly all factors entering in a given case and to keep primarily in mind the thought of what is best for the patient's welfare. With these elements always in mind, needless or harmful treatment will be avoided.

ANATOMY

The ethmoid labyrinth, anatomically considered, is the central point in the nasal accessory

* Read before the Eye, Ear, Nose, and Throat Section of the California Medical Association at the Fifty-Eighth Annual Session, May 6-9, 1929.

sinus system. Therefore it is nearly always the site of pathologic processes when other sinus infections are present.

The ethmoid is subject to many anatomical variations. There may be accessory cells in various locations, such as the large cell which is frequently encountered in the tip of the concha media. Another frequent variation is that of a large ethmoidal cell directly in front and above the sphenoid itself. These accessory cells are often infected and failure to exenterate them will cause a persistence of symptoms. The openings of the ethmoid cells into the nose are separated into two groups by the plate of the concha media; the posterior group of ethmoid cells open above and posterior, and the anterior between the concha media and lateral wall of the nose. Secretion appearing in the nares between septum and concha media comes from the posterior group. Secretions appearing between the concha media and lateral wall of nose in middle meatus come from the anterior group.

The outer wall of the ethmoid is formed by the orbital plate and by the mesial wall of the maxillary antrum. This plate is very fragile and easily penetrated.

The brain fossa has an intimate relation with the roof of the ethmoid labyrinth. The bony roof of the ethmoid joins the cribriform plate, but the cells are not in contact with this plate, the bone here being rather heavy. The cribriform plate is the roof of the common meatus. The most dependent portion of the ethmoid labyrinth seen in inspection of the nasal cavity is the bulla ethmoidalis. This appears as a rounded protuberance just under the concha media. The unciform process has an enclosed cell, sometimes quite large, termed the agger nasi. This is to the outer side of the bulla on lateral wall. Occasionally there is a large ethmoid cell just under the frontal sinus. Swelling of this often causes occlusion of the nasofrontal duct simulating a frontal sinusitis.

A thorough knowledge of the regional anatomy is necessary to successful operation upon the ethmoid. One should take into consideration the various anatomic variations of this sinus and look for them while doing the operation.

The ethmoid labyrinth is the embryologic center of development of the sinuses, the others being outgrowths of it. Because of its relation to the other sinuses, consideration must be given to the ethmoid labyrinth as a factor in all sinus infections. More or less involvement of the ethmoid is always present in all sinus infections. Proper treatment and results in sinus infection are in ratio to the consideration of the ethmoid factor. Nasal infections usually have as a primary site the ethmoid labyrinth, and it is also most often the last point of infection to be cleared up. Shambaugh¹ states: "Surgical treatment of inflammatory processes of any or all nasal sinuses includes to a greater or lesser extent operation upon the ethmoid labyrinth."

PATHOLOGY AND SYMPTOMS

Colds. The most prominent etiologic factor in ethmoid infection is the so-called common cold. This is an acute catarrhal infection involving the mucous membranes of the nasal passages. Acute catarrhal ethmoiditis is frequently found as an associated condition. In this the mucous membrane of the ethmoid region becomes edematous and intumescent. There is a profuse serous exudate which causes partial or complete occlusion of the ostia of the ethmoid.

Examination of the region of the middle meatus shows the characteristic swollen appearance of the undersurface of the concha media, unciform process and bulla ethmoidalis. There is considerable mucoid secretion seen in the middle meatus. Small mucous polyps may be seen covering the surface of the mucous membranes of the region.

Influenza. Another type of acute ethmoiditis is that seen during epidemics of influenza. In this type the discharge is more watery and the membranes of the nares have a deeply injected appearance. The conchae are greatly swollen and cause occlusion of the nasal passages. The pain is severe, radiating along the course of the seventh and fifth nerves. Accompanying the process there is often an otitis with reddened tympanic membrane and injected canal walls.² There may be temporary visual disturbances due to inflammatory processes around the optic tract.

Acute Catarrhal Ethmoiditis.—The symptoms of acute catarrhal ethmoiditis are those which arise because of insufficient drainage and ventilation of the ethmoid cells. There is a feeling of fullness or pain between the eyes. There is a great deal of sneezing, together with a profuse discharge, which at first is thin and watery, but soon becomes thick and tenacious. The symptom of sneezing is characteristic of ethmoid involvement, being due to irritation of the sensitive nerve endings in that region. Due to the intense edema of the structures, breathing through the nose is interfered with. There is profuse lachrymation and swelling around the orbital rim. The history given is that of a persistent cold.

Empyema. At times the condition progresses and the drainage of the region is so interfered with that an empyema of the ethmoid results. The symptoms are those of pressure, the pain in some cases being quite severe. There may be softening of the bony walls around the orbit with production of edema and later a fistula at the canthus.³ Marked exophthalmos may be present. This condition may simulate that of a cavernous sinus thrombosis.⁴ Rarely there is extension backward through the sphenoid ostia and upward through the cribriform plate, producing meningeal symptoms or even brain abscess. Basilar infection may result, causing symptoms similar to an encephalitis.⁵ The suggestion is made that there is a possibility of the encephalitis which at times follows influenza having as an associated factor, involvement of the posterior group of sinuses. A recent report by Pfahler⁶ attempts to demonstrate by skiagraphs basilar involvement and bony

changes due to chronic posterior group infection. It is entirely within presumption that this may happen in rare instances, but one would hesitate to operate on these cases from the skiagraph findings alone.

Empyema of the ethmoid usually have as sequelae, antrum, and occasionally frontal, infection. The latter is sometimes complicated by closure of the nasofrontal duct by swollen ethmoid cells. Here the symptoms are quite severe, pain with marked edema of eyelids being present.

The empyema may become a chronic condition attended by a more or less continuous purulent nasal and postnasal discharge of offensive odor and acrid character; the postnasal discharge causing in turn a severe pharyngitis and laryngitis or a tracheobronchitis. The history in such cases is that of a profuse discharge upon arising in the morning, accompanied by coughing and expectoration until the night's accumulation has been gotten rid of.

Chronic Hypertrophic Ethmoiditis.—The common chronic type of ethmoid involvement is that of chronic hypertrophy. This is a nonsuppurative condition, but may have a secondary infection superimposed. In the hyperplastic type the mucous membranes undergo a polypoid form of degeneration. Later the bony structure itself is the site of absorption and proliferation of new bone. This is cystic, soft, fragile bone. The underlying structure of bone becomes eburnated resembling in structure bone in which arthritic changes have taken place.

The characteristic symptoms of this type are frequent sneezing and profuse watery, acrid, irritating discharge. Frequently a troublesome cough, due to tracheobronchial infection, is present. Complaint is made of a stuffy feeling in the nose or of complete nasal obstruction. Patient may state he has had a persistent cold or catches cold very easily. The mucous membrane of the nose seems to be sensitive to proteins such as flowers and dust. This type of ethmoid infection is often present in hay fever patients. Many cases of hay fever do not have the physical findings of hyperplastic ethmoiditis, but in those cases that do, surgery is of great benefit.

Certain asthmatic conditions have an associated hyperplastic ethmoiditis. It is in these cases that surgery gives its best results. Not all cases of asthma are due to or have hyperplastic ethmoiditis or ethmoid infection of any type. Careful study must be made of each case before determination can be made as to the advisability of ethmoid exenteration. Various protein tests should be made by one who is familiar with the allergic reactions. Careful physical examination should be made by a competent internist. It is believed that only with the closest coöperation between family physician, internist, and rhinologist, can results be had in these cases. There is no one causal factor in the etiology of asthmatic conditions. Treatment should not cease with the operation.

Neuroretinitis. The problem of neuroretinitis is one in which the rhinologist is much interested. Frequently there is an ethmoid infection factor present in these cases, often of the hyperplastic type. Detailed study must be made of these cases to determine whether or not operation will benefit. There is no one diagnostic aid that will help. Of course, in those cases where definite suppurative processes can be found, operation is imperative. Those cases with absence of any suppurative processes present a difficult proposition as to advisability of operation. These cases are those of the hyperplastic type usually. The evidences here of infective processes may be slight, yet the patient may have a definite nerve involvement. The decision in these instances should rest upon the question of the severity of the sinus infection and the degree of the nerve involvement. Where either factor is present in severe degree the case should be operated. In case of mild sinusitis and retinitis expectant treatment is advisable, the case being carefully observed. It is a well-known fact that many neuritic and inflammatory conditions in other parts of the body subside without radical treatment. It is therefore reasonable to expect that the mild cases of optic nerve involvement will recover. All cases of optic neuritis should not be subjected to such a formidable operation as sphenoid and ethmoid exenteration. Those cases of sudden onset, with definite sinus disease, central scotomata and loss of color perception should be operated without delay because here the damage to the nerve may be permanent if operation is delayed. Those cases that present themselves with history of old persistent nasal discharge, gradual color loss and fundus findings of an old process should be gone into carefully and each case decided as a clinical entity. Simply because one patient responds wonderfully to operation is no reason why the next patient should have operation. This is a wholesome thought that recurs as we see patients who have had ill-advised nasal operations performed by those who have not attained a proper appreciation of the limitations of surgery.

Luetic infection of the ethmoid. This condition presents a mixed hyperplasia. There may be necrosis of the ethmoid cells with extension into the orbital plate. Rarely there is reported a case of gumma of the concha media with extension into the ethmoid.

Mucocele. Occasionally physicians who do eye work see a mucocele of the ethmoid region. This is present in an anatomic variation of the usual ethmoid cell, the cell being much larger and placed laterally. Marked exophthalmos may be present. Sometimes it is difficult to differentiate from a tumor of the orbit.

Atrophic form of ethmoid labyrinth disturbance. Here the changes are usually associated with atrophic processes in the nasal mucous membrane and bony framework. In this the lateral bands of the pharynx are deeply injected. There are thick mucopurulent crusts present in the oropharynx. A condition of pharyngitis sicca, as is also present in chronic sphenoid sinus infection,

is often associated. There are deposits on the vocal structures giving rise to an irritating dryness and hoarseness. Marked ozena is often a sequela. This is an unfortunate complex for the patient, and any promise of relief is gratefully received.

DIAGNOSIS

The diagnosis of the suppurative types of ethmoid infection should present no especial difficulty. The symptoms are clear and the physical findings distinctive. The source of the discharge is located by anterior and posterior rhinoscopy. The nasopharyngoscope can be used to advantage. Skiagraphs are helpful but not essential.

The hyperplastic type is usually easily diagnosed. Here the presence of the polypoid tissue in the region of the middle meati is seen. Post-nasal examination by mirror discerns the polypoid degeneration of the posterior ends of the conchae. The lateral bands of the pharynx may be found injected.

Other types of cases in which the physical findings are not especially distinctive are more difficult of diagnosis. It is in these cases that carefully made roentgenograms are of great value. Granger⁷ and others have established special technique which often helps one to discover posterior group infection. It is very essential that we should familiarize ourselves with the proper interpretation of the roentgenograms of the area. We should not be compelled to take as final the report of findings alone. Injection of the sinuses with opaque material, such as iodized oil preparations, is of great value in securing a better estimate of the situation.⁸

TREATMENT

The treatment of ethmoid disease presents a problem. The anatomic situation of the ethmoid labyrinth, together with its surrounding structures, makes the surgical intervention difficult. It is necessary to completely remove the foci of infection, but it is even more important not to destroy nasal tissue unnecessarily. Many of the poor results obtained are due to unskilled operative procedures in the nasal passages by those who do not have a proper appreciation of the anatomy and physiology of the region. Atrophic rhinitis, loss of smell, persistent fistula, and even damage to orbital or cranial contents may result because of careless surgical work of the ethmoid region. In rare cases only is it necessary to remove a large portion of the middle turbinal body. In many cases even resection of the concha media is not needed. Where the naris is narrow, simple high submucous resection, together with infraction of the concha media toward the septum will give ample space to exenterate the ethmoid. Cases that have marked deviation of the septum are most likely to have the most ethmoid involvement on the side with the free space. This is because of the marked hyperplastic changes that have taken place in the region. This hyperplasia is secondary to a compensatory hypertrophy which occurs in nature's effort to have the unobstructed side perform the physiologic functions normal to both sides.

Entrance into the ethmoid labyrinth is obtained by opening either the bulla or the agger nasi cell. Exenteration then can be done backward, using a Gruenwald or Knight forceps, care being taken to stay in the midline in both meridians. This will obviate the danger of opening into the orbital plate or superiorly the cribriform plate. The exenteration is carried backward until the rather firm wall of the sphenoid is met. The anterior and lateral group of cells can then be searched out and exenterated by use of Mosher's curet or a small Gruenwald. Anatomical anomalies should be looked for and exenterated, especially the large cell often found just under the frontal. In cases that have retrobulbar symptoms the layer of cells around the inner and posterior rim of the orbit should be looked for. There is little danger of injuring the orbital contents if one is cautious and does not use force in pulling out tissues. There is a rather thick layer of orbital tissue between the eye itself and the ethmoid. Care should be taken not to unhook the tendon of the oblique muscle of the eye while exenterating the superior cells.

Anesthesia.—It is essential to success to have perfect anesthesia and hemostasis. Ephedrin added to the anesthetic material used is slower in action than adrenalin, but the effect is more lasting. A combination of both is quite useful. The choice of anesthetic is left to the individual operator. Some are using butyn; some use cocain paste; some, a 2 to a 20 per cent solution of cocain. It is believed that more toxic absorption is obtained from packs of cocain solution than from cocain paste topically applied. One can regulate the amount of paste, but the amount of absorption from packs is an unknown quantity. A preliminary dose of one of the barbitol derivatives is useful in preventing shock, it being the physiologic antidote for cocain toxicosis. Nasal packs may be used after operation if severe hemorrhage occurs, none being used otherwise, as it is not believed wise to allow retention of the secretions. In the best interests of patient and physician, patients requiring exenteration should be hospitalized. Here any emergency measure can be easily carried out. The practice of carrying out operative procedures in the office and returning the patient to the home, or even to the street, is undesirable. Contact with the patient is lost and makes possible annoying and troublesome incidents.

Complete exenteration should be carried out in those cases where the indications are present. In the simpler cases, infraction of the concha media with opening into agger nasi and bulla ethmoidalis is all that is needed.

Experience with radium in the hyperplastic types has not been satisfactory. Its use in malignancies is indicated, as is diathermy. Myerson has reported some interesting work along this line.

In the simpler types of acute catarrhal ethmoiditis, careful shrinking of the nasal membranes with a suitable agent gives relief. Weak solutions of cocaine with addition of small amounts of ephedrin or adrenalin have given best results. Adrenalin or ephedrin alone have not been so satisfactory, the secondary swelling being greater than the primary after a short interval of time.

Nasal irrigations should, in the acute cases, be looked upon with caution. Many times one sees tubotympanic processes set up by unwise irrigation.

The use of vaccines and general medication does not come within the scope of the specialty. If the patient is in need of general treatment he should be referred to the family physician, together with any suggestion toward treatment. We should be careful not to invade the field of the general man. It is his place, not ours, to administer vaccines, drugs, etc. The use of the various antiseptics in the treatment of ethmoiditis has not been satisfactory. The mild silver preparations do have some astringent effect, but it is not believed that the condition is helped by them.

It is desirable to mention in this connection the treatment of ethmoiditis by the external operation. One sees at times a patient with fulminating pansinusitis where the ethmoids are equally involved with other sinuses. These patients are often extremely ill, with high temperature and evidence of a very severe general sepsis. Delay in operation may result in fatal issue because of the rapidity of the destructive processes. One should not temporize in these cases by minor operative procedures. Complete exposure of the infected areas should be the aim. The external route is the best and quickest method to be undertaken. All bony walls of sinuses involved should be laid open and drainage established. The type of external operation should be chosen that will best accomplish this purpose. Here again supportive measures are of the most importance. The patient should also be under the observation of a competent internist. Transfusion should be done early if indicated. These massive infections seem to be of two types, those caused by staphylococci and those of mixed infection with the streptococci hemolyticus present. The latter patients usually present themselves during influenza epidemics.

Ethmoiditis in children is common.⁹ Usually it is of the mild catarrhal type and responds to local measures. In the purulent type free opening of the bulla is usually sufficient. This of necessity must be done under general anesthesia. Any or all of the types and symptoms found in adult life may be present in children. Many cases of tubotympanic disease have ethmoidal infection as a casual factor.¹⁰ Treatment should be prompt and persistent.

CONCLUSIONS

Ethmoiditis is a frequently encountered condition and may be of grave consequence if untreated.

Careful survey of each patient should be made as to advisability of surgical treatment. Surgery of the posterior sinuses should not be recommended unless definite pathological conditions can be clinically established.

Surgery of the ethmoid region should properly be performed in hospitals.

Most cases of mild infection will readily clear up under proper local treatment.

Collaboration between internist, roentgenologist, family physician, and rhinologist is very desirable.

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DISCUSSION

F. H. LINTHICUM, M. D. (914 Pacific Mutual Building, Los Angeles).—In a survey of the highly involved subject of infection of the ethmoid labyrinth, Doctor Arnold's excellently presented plea for conservatism in this field of our specialty is timely. We have all realized that present-day sentiment is turning away from the radical procedures which have been in vogue in the past, in favor of the more conservative consideration and treatment of sinus disease in general, and ethmoid infection in particular.

So-called preventive medicine has claimed the attention of workers in many specialties—perhaps as little in ours as in any other. It would seem that an opportunity is offered in this field in the subject under discussion.

All acute sinus infections have a tendency to heal spontaneously. Such infections become chronic in two ways. First, as the result of repeated acute attacks, which bring about changes in the mucous membrane, resulting in destruction of the ciliated epithelium, accompanied by cellular infiltration, or the deposition of scar tissue. Too frequent acute attacks may also bring about occlusion of the secretory ducts, giving rise to hyperplastic formations and the presence of polypi. Second, because of mechanical or obstructive causes. These comprise anatomical anomalies, polypi, enlarged turbinates.

It is probable that the groundwork for much of adult ethmoid disease is laid through the neglect of the so-called simple head colds which occur in childhood and early adult life, or by failure to correct the various intra-nasal or pharyngeal obstructions which play a part in the susceptibility to these colds. It is an axiom that is too often overlooked, that the ventilated nose will usually take care of its own acute infection except in the presence of chronic diseases. The con-

gestion brought about to the mucous membrane of the nose by an acute coryza is one arc of a vicious circle. The swollen mucous membrane occludes the sinus orifices and the ensuing sinusitis will not permit the congested mucous membrane to subside of its own accord. Neglect of repeated insults such as these to the sinus groups eventually results in destruction of or pathologic changes in the lining mucous membranes, which tend to give rise to chronic ethmoid or other sinus disease.

An acute rhinitis cannot be cured overnight by any method, but certainly the nasal passages which are kept ventilated during the course of an acute infection will right themselves much more rapidly than a neglected nose, and the shorter the course of an acute infection the less chance of permanent damage to the ethmoid labyrinth.

Just as important from the standpoint of ethmoid and other sinus disease is the removal of mechanical obstructions to nasal ventilation as early in life as is consistent with safety. These two groups of the more common causes of chronic disease of ethmoid are correctable and to an extent preventable; to correct them means to persuade the specialist to remove mechanical obstructions in the patients whom he sees late in childhood or early in adult life and to educate the parent in the proper way of taking care of an acute coryza and not to say, "The child just has another cold."

ISAAC H. JONES, M.D. (1930 Wilshire Boulevard, Los Angeles).—It seems to me that Doctor Arnold has given a balanced and proper valuation of medical and surgical treatment of ethmoiditis. It is practically impossible to generalize on such a subject. Such a very few years ago there was no ethmoid surgery—or, for that matter, no tonsillectomy or submucous resection of the septum. All are contented with the rather uniformly satisfactory results of operation on the tonsils and the septum. It is such a different matter with the nasal sinuses, particularly the ethmoids. About two decades ago careful anatomic studies of the sinuses caused us all to feel that the sinus problem might be solved. For a long period nasal operations were performed for anatomical reasons only. The leaders in rhinology have all felt in the past few years that much of the radical surgery of the sinuses has disregarded essential physiologic facts. We all see many patients who on the one hand are uncomfortable with pus and crusting, or on the other hand suffering neuralgic pain which is most difficult to relieve. Much sinus surgery is surely necessary and on the whole satisfactory, but this is more true of the maxillary antrum and less of the sphenoid, frontal and ethmoid. The ethmoid constitutes such a honeycomb of cells of such varied size and structure and interrelation, that the establishment of even adequate drainage is difficult without radical exenteration. Recently, in cases of old and extensive involvement of maxillary antra and ethmoids, we removed the ethmoid cells through canine fossa approach. From the anatomic standpoint this is all very well, but one must wait for many months before one can say that the end result is satisfactory. It is very easy for us to say that all necrotic bone and polypoid tissue must be removed, but it is difficult to limit any work on the ethmoids to such pathologic tissue. We are surely unable to avoid also removing a certain appreciable amount of healthy bone and valuable mucosa with its invaluable ciliated epithelium. After any radical operation, one then awaits for the final result with no great assurance of a satisfactory outcome. Personally, if I were afflicted with ethmoiditis, chronic, I would wish prolonged local care before any surgery and then, if unavoidable, a most modified form of surgery; it is always possible to remove more and more, but it is not possible to restore structures that have been removed.

It is intriguing to consider what the bacteriophage will come to mean to us. It will surely meet a definite need, if its action proves to be applicable to subacute or chronic infections of the ethmoids or other

sinuses. D'Herelle first noted that a test tube of culture media clouded by bacterial growth would become clear upon the addition of a certain strain of bacteriophage. This spontaneous bacteriolysis has occurred in cultures of various forms of staphylococcus—not in streptococcus. Schultz of Palo Alto has reported such work at this meeting. To be sure, we can never expect that any bacteriophage can restore degenerated tissue. However, if local application to the sinuses can bring about a prompt local bacteriolysis, we do know what a remarkable recovery is possible in tissue, once the bacterial factor is eliminated. It is encouraging, in this connection, to know that the most usual organism in the infected nasal sinus is the staphylococcus.

✽

DOCTOR ARNOLD (Closing).—Doctor Shambaugh would be very gratified, I am sure, if he could be here and listen to the note of conservatism that is predominant. Those who are sponsors of postgraduate instruction in the specialty are teaching that surgery should only be resorted to when other measures have failed, and that when it is performed the nasal tissues should be left in as near a normal condition as possible, so that physiologic functions will not be destroyed.

POLIOMYELITIS*

A REVIEW OF THE LITERATURE

By BEATRICE HOWITT, M. A.
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EARLY EPIDEMICS

THE first big epidemics of poliomyelitis were reported from the Scandinavian countries, that in Sweden being described by Bergenholtz in 1881. As early as 1840 Heine had first described the paralytic form as a separate disease entity, but it was not until after the second Swedish epidemic in 1887 that Medin recognized the early and preparalytic forms. From this starting point in Sweden, outbreaks were noted in Norway, in Germany, in Austria, and then in the United States in 1907. Another severe epidemic was reported in this country in 1916, principally in the State of New York.

These outbreaks stimulated much research both here and abroad, especially by Flexner and his associates at the Rockefeller Institute and by Landsteiner, Levaditi, Leiner and V. Wiesner in Europe. During this period it was experimentally shown that the disease was due to a filterable virus and that it could be transmitted from monkey to monkey by different routes of inoculation, producing clinical poliomyelitis. It was also demonstrated that the serum of a recovered monkey was capable of neutralizing an infective dose of virus in vitro.

RECENT EPIDEMICS

After the first output of experimental work on poliomyelitis, interest seemed to wane, until it was again aroused by the occurrence of fresh epidemics throughout the world. This review is therefore dealing largely with the most recent information published during the past five or six years.

According to the 1930 report of the League of Nations,¹ the most important epidemics of polio-

* From the George Williams Hooper Foundation for Medical Research, of the University of California, San Francisco, California.

myelitis since 1924 have been in England in 1926 to 1927, with 2191 cases and 255 deaths; in Germany in 1926, especially in Saxony, with 587 cases and ten deaths; Roumania in 1927, lasting until 1929, with 2635 cases and 300 deaths (11.38 per cent); in the United States in 1926 and 1927, when 10,151 cases were reported, with a fatality rate of 21 per cent, California, Massachusetts and Ohio suffering the most; in different Canadian provinces in 1927, 1928 and 1929; New Zealand in 1925, with 1319 cases and a mortality of 13.1 per cent, and in Iceland in 1924, with 463 cases and 89 deaths.

REPORTABILITY

Wherever the disease has become prevalent, measures are then undertaken to make it reportable. There is obligatory notification in most of the civilized countries of the world, except in Czecho-Slovakia, in Turkey and in Japan. From the statistics gathered, it is shown that the disease is a serious one with an average death rate of 12 to 13 per cent.¹

STIMULATION OF RESEARCH IN DIFFERENT SECTIONS

As a result of these epidemics, different commissions have been appointed for investigation and special sums of money have been donated for further experimental work.

In the United States, the Harvard Infantile Paralysis Committee, under the direction of Doctor Aycock in Boston, has done most effective work throughout Vermont and Massachusetts. A commission was also formed to aid in the Roumanian outbreak and one also for the Canadian.

In 1928 a large donation, known as the Milbank Fund for Research on Poliomyelitis, was distributed in the United States to Doctor Jordan at the University of Chicago, to Doctor Gay's laboratory at Columbia, and to Doctor Park of the New York Public Health Department, while the Lister Institute in London and Bordet's laboratory in Belgium have also been recipients abroad. Separate funds have been given in the United States for this special study, including that given to the University of California in 1928. The Rockefeller Institute has also continued with the same problem. With all these workers in the field something of interest should be forthcoming.

EPIDEMIOLOGY

Poliomyelitis is a disease mainly of the temperate or colder climates and becomes less prevalent nearer the equator. At the same time it also has a seasonal variation, being more prevalent during the summer and autumn than the winter or spring, although sporadic cases are occasionally reported for the latter seasons. This seasonal variation holds true for the southern as well as the northern hemisphere, as shown by Aycock.² In Australia and New Zealand the morbidity curve attains its peak in February and March, when the climatic conditions correspond to ours for August and September.

Aycock³ has shown that the age distribution of poliomyelitis corresponds to that for measles and for diphtheria; that there is a greater preponderance of cases in the younger age groups in urban than in rural communities for all three diseases, and that the case incidence in the various age groups is directly proportional to the concentration of the population. In measles the age distribution is determined by immunity from an attack of the disease, while in diphtheria it is determined largely by subclinical immunity. Reasoning from the similarity of the age distribution of poliomyelitis, measles and diphtheria, Aycock deduces that the age distribution in poliomyelitis is dependent upon immunity, largely subclinical. He shows that although poliomyelitis has a lower incidence in the southern United States than in the northern, the age distribution is of the same order in both sections. He believes this an indication that immunization in the South is just as rapid as in the North and in fact he asserts that from the age standpoint the virus may spread with even more rapidity in the southern states. Therefore, early infection in the South may account for the relatively more extensive subclinical immunization.

Since it is evident that in an epidemic the disease is irregular in its attack upon individuals, it is therefore quite probable that a widespread immunization, especially in urban districts, must occur early in life, either due to subinfective doses or to an abortive attack of the disease.

In a recent paper Aycock and Kramer,⁴ (1930) give experimental evidence to show that serum from a group of adults in a southern population was capable of neutralizing the virus in vitro. Neutralization occurred with eighteen out of twenty-one serums from individuals giving a negative history of poliomyelitis.

In another article⁵ the same authors give further observations concerning immunity to poliomyelitis as shown by neutralization tests in monkeys. They found that neutralization in vitro occurred with both monkey and human convalescent serum, with serum from immunized monkeys and also from a certain number in a group of normal individuals. Normal monkey serum was always inactive against the virus. They believe that the "tests in normal individuals are in conformity with and extend previous observations to the effect that a widespread immunity to poliomyelitis exists among individuals not known to have had the disease. Additional evidence is afforded that this immunity originates in exposure to the virus and, from the extent to which it occurs and the order in which it develops, that the virus spreads by person-to-person contact."

Because of these observations, Aycock apparently discards his previous hypothesis of "autarce-sis,"² a term used by him to designate a certain hypothetical physiological activity of the body which might influence resistance to poliomyelitis, in counter distinction to that state of immunity provoked by the disease itself.

METHODS OF PROPAGATION

It has been generally accepted that the intranasal route is the usual one for infection with poliomyelitis virus, as shown by Flexner⁶ and his associates. Recently, however, several men have implicated the intestinal tract as another source of entrance. Kling,⁷ (1929), in an extensive study of the epidemics in Sweden, Saxony and Roumania, believes in the water-borne nature of the virus. This is discredited by others, since the mode of transportation, in Sweden especially, is mainly by water, and also because Kling and Levaditi have not been able to demonstrate the virus in water or in milk.

Aycock⁸ reports that the virus may be transmitted through milk, as an infrequent means of infection, basing his opinion on the results of studies on two American epidemics and one at Broadstairs, England. However, he does not believe that the virus is taken in through the digestive tract itself, but rather that it is absorbed by contact with the nasopharyngeal mucosa.

Kling, Levaditi and Lepine,⁹ (1929), on the other hand, have given experimental evidence to show that the virus may produce the disease when given a monkey by stomach tube or by injection into a loop of the ileum. However, this result could only be obtained when a particular variety of monkey, the cynomolgus, was used.

Clark and Schindler,¹⁰ (1930), at the University of Wisconsin, have recently reported their ability to concentrate the virus by distillation in vacuo and were able to utilize this method with the feces of monkeys fed virus suspensions. The virus was found to pass unaltered through the intestinal tract.

Although poliomyelitis is undoubtedly transmitted by direct contact in many instances, yet it is usually a rare occurrence when more than one member of the same family contracts the paralytic form of the disease. Aycock¹ believes if several members of the family have poliomyelitis that there is probably a common source of infection. In the Roumanian epidemic¹ it was found that the number of families in which more than one case occurred simultaneously represented only 12 per cent of the total number of families infected. In the 1927 outbreak of Alberta, Canada, Jenkins¹² reports that out of 189 families, fourteen had two or more definite cases of poliomyelitis. If the possible non-paralytic cases were included the number would reach forty-seven families out of the 189.

A common source is therefore suggested. While most people implicate a healthy carrier as this source, yet there is also a possibility that milk or even water may play some rôle.

ETIOLOGY

Except for the work of Rosenow, it is generally accepted that poliomyelitis is due to a filterable virus. Rosenow¹³ considers a small gram-positive diplococcus as the main cause of the disease. He reports having found it in the spinal fluid of

both human and monkey cases. He also has isolated it from the brain and cord.

However, in 1929, Olitsky, Rhoads and Long¹⁴ at the Rockefeller Institute, repeating Rosenow's technique and using his type of medium, failed to cultivate streptococci from cases of experimental poliomyelitis. They also showed that the yeast medium he used may naturally contain streptococci, and that this organism may be isolated occasionally from the brain of a normal monkey.

Fairbrother,¹⁵ (1929), published an extensive report on coccal organisms in poliomyelitis, showing that while they may be occasionally isolated from the tissues of monkeys with the disease, yet similar cocci may be obtained from normal animals or from those having other ailments. These cocci were shown to have no etiological relationship with poliomyelitis, but belonged to a group of air micrococci.

Clark and Schindler¹⁰ also reported that while poliomyelitis virus will survive the high salinity of their concentrated suspensions for from four to five months, the streptococci will not live for over one month. From the work of these men, it seems evident that streptococci need not be considered as a specific factor in poliomyelitis.

Landsteiner and Levaditi¹⁶ early showed that the tonsils may harbor the virus, and more recently Aycock and Luther¹⁷ have reported a relationship between tonsillectomies and the onset of poliomyelitis. In the report by the League of Nations¹ the idea is newly advanced that the virus gains entrance in the pharyngeal region and becoming localized there, secretes a toxin, possessing neurotropic properties like that of tetanus or diphtheria. Perhaps a local immunity is engendered by the virus in the tonsils or pharynx, thus protecting the host against the disease.

TRANSMISSION OF THE POLIOMYELITIS VIRUS TO OTHER ANIMALS

The virus has been successfully transmitted to only one type of experimental animal, the monkey, preferably the macacus. Different men have reported being able to infect rabbits, but recently several articles have appeared which conclusively prove that the rabbit is not susceptible. (Fairbrother,¹⁸ Harmon, Shaughnessy and Gordon,¹⁹ and Thompson.²⁰) Harmon²¹ and his associates have also successfully shown that no other animals can be infected, using young dogs and cats, guinea pigs, mice, young pigs, lambs and calves.

INCUBATION PERIOD

In 1929 Aycock and Luther²² studied a large number of cases in order to ascertain the incubation period for poliomyelitis. They found that in man it varied from six to twenty days, and consider that the time of greatest infectiousness is probably "from the fourteenth day preceding the onset of symptoms to at least the fifth day of the disease."

DIAGNOSIS

Early diagnosis is quite essential for the successful treatment of poliomyelitis. Luther²³ in 1927, and Aycock^{24, 25} in 1928, have given de-

tailed methods of diagnosis that are of practical value for early recognition of the preparalytic stages of the disease. They both state that while fever, headache, occasional gastro-intestinal disturbance and drowsiness may be present, they are not sufficiently characteristic to complete the diagnosis, so that one should watch for the following symptoms: a flushed face, a rapid pulse, more prostration than the temperature would warrant, coarse tremor, rigidity of the neck (though not as marked as in meningitis), stiffness of the spine with a bending forward from the hips with the spine rigid, a very slight Kernig's sign but with hyperactivity of the deep reflexes, diminishing later. With these symptoms present a cerebro-spinal puncture is advocated to confirm the diagnosis. There is an increase of white cells, usually between 50 to 250 per cubic millimeter, according to Aycock, but may run as high as 700 to 800. The globulin is increased and the sugar normal. Paralysis may occur in the following forty-eight to seventy-two hours, but there is no way of predicting which cases having these early signs may later become paralytic. For this reason the early administration of convalescent serum is advocated.

TREATMENT

The use of serum treatment was advocated by Netter in France about 1910 and 1912. Since then three types of serum have been tried, convalescent human serum, antipoliomyelitis immune sheep or horse serum, and horse serum immunized against the streptococcus of Rosenow, injected by various routes.

(1) *Convalescent Human Serum.*—The use of this serum seems the most rational, since it has been experimentally proved that such serum has neutralizing powers when injected with the virus into a monkey.

Netter²⁶ gave the serum intraspinally to thirty-two cases, in 5 to 13 cubic centimeter amounts. Six patients recovered completely, fifteen showed varying degrees of improvement, in three there was no change, while eight died. Since then the use of convalescent serum has been tried with varying degrees of success, given intraspinally, intravenously, or combining the two methods, as advocated by Amoss and Chesney²⁷ in 1917.

Aycock and Luther²⁸ in 1928 reported favorably on the use of convalescent serum given intraspinally and intravenously in 106 cases diagnosed in the preparalytic stages. Since 64 per cent of these cases later developed paralysis, it was evident that they were not dealing with the non-paralytic form of poliomyelitis. Total paralysis developed in 19 as against 63.6 in 482 untreated cases, while only 5.7 per cent showed the more severe grades of paralysis in contrast to 46 per cent in the untreated group. They concluded from their data that when convalescent serum is given in the preparalytic stage, the results are favorable "as shown by: a low mortality rate, a low average total paralysis, and a strikingly low paralysis of the severer grades." In 1929²⁸ they presented further observations on the use of con-

valescent serum given in the preparalytic stage to a group of 116 cases, with comparable results.

Ayer²⁹ in 1929 made an interesting report on the use of serotherapy in preparalytic poliomyelitis, giving in detail his methods of diagnosis and the technic of serum preparation and administration, using 10 to 25 cubic centimeters intraspinally. The comparative results are also given of treating a portion of the group of 126 cases with anti-pneumococcus serum. Twenty-three patients were given this serum alone and eight an initial dose followed by human convalescent serum. The other patients were treated with the latter alone. According to Ayer, there was no great difference in the results following either treatment, but he does not advocate the use of anti-pneumococcus serum because of the danger of serum sickness. He also considers it futile to administer serum therapy to paralytic cases, the best results being obtained in the preparalytic stage.

A comprehensive report on the technique of convalescent serum therapy was published by Aycock, Luther and Kramer³⁰ in this same year. It included a description of the bleeding apparatus, the method of obtaining blood from the donor, the preparation of the serum, the method of administration and the possible reactions of the patient to the serum.

In France since 1922 different men have used convalescent serum intraspinally, followed by repeated intramuscular injections. In California Shaw, Thelander and Fleischner³¹ in 1925 and again Shaw and Thelander³² in 1928 reported favorably on the intramuscular administration of serum in preparalytic cases. In the latter report the results are given for a series of eighty-one cases, forty-three of which received intramuscular treatment. There was no fatality nor paralysis among the seventeen cases treated within the first forty-eight hours after onset, while the amount of persistent paralysis and the number of deaths increased the later the serum was given in the course of the disease.

Fifty cubic centimeters of serum has been considered one dose for children under five years when using the intramuscular method. If the patient is over five years 100 cubic centimeters or more are advocated, according to the severity of the case.

The serum is best obtained from convalescents from one month to one or two years after the acute state.

In the Canadian epidemic of 1928 to 1929, the intramuscular method of treatment was used almost exclusively as recommended by the Medical Research Committee of the University of Manitoba.³³ Twenty-five cubic centimeters of convalescent serum was given as the standard amount. From the reports issued the results of the treatment seem very encouraging.

(2) *Immune Serum.*—In 1918 Pettit³⁴ in France reported the successful immunization of both a sheep and a horse to the virus of poliomye-

litis, although Stewart and Haselbauer³⁵ in 1928 were able to obtain only doubtful results in attempting to repeat the sheep immunization. They also state that there is no definite experimental evidence for the use of Pettit's serum because he employed only one neutralization test with this serum in monkeys and failed to use a control with normal sheep serum. The latter has been shown to contain a small amount of neutralizing ability against the virus.

No one else has been able to successfully immunize a large animal with poliomyelitis virus until recently, when Fairbrother,³⁶ (1930), obtained a serum by the intramuscular injection of a horse. This serum, after fifteen injections over a two months' period, was able to neutralize a potent virus in vitro, provided the ratio of serum to virus was equal to or greater than one. When the ratio was reversed, infection occurred. However, it had no value when tested therapeutically against monkeys given the disease.

The serum of Pettit has been used by many French physicians, the results being reviewed by Etienne¹ at the Congress of French Pediatricians in 1927. While he was very enthusiastic over the results, other members of the Congress were not in accord with his views.

In the Roumanian epidemic of 1927, several methods of treatment were given, dividing the cases into separate groups. Marinesco Manicaticide and Draganescu,³⁷ (1929), report the results of using human convalescent serum, Pettit's serum, auto-hemotherapy, x-ray plus diathermy, and of leaving a certain group without specific treatment.

(1) Convalescent serum was used in nineteen patients with 31.5 per cent complete recovery.

(2) Pettit's serum was used in thirty patients with 23.3 per cent complete recovery.

(3) With the x-ray and diathermy 22.2 per cent patients showed complete recovery.

(4) While of the fifty-two untreated patients 15.3 per cent recovered completely.

(3) *Rosenow's Serum*.—Rosenow¹ has used his antistreptococcus horse serum in 1300 cases of poliomyelitis and considers the results favorable. Stewart and Haselbauer,³⁵ (1928), however, were unable to obtain experimentally any neutralization of the virus with Rosenow's serum either concentrated or unconcentrated. They consider that there is no sound basis for its therapeutic use.

It is thus seen that several types of serums have been used by different groups, usually with favorable reports, although there has been no particular uniformity as to the size of the dose or the method of treatment. The difficulty in trying to estimate the true value of these reports lies in the fact as shown by Kellogg,³⁸ (1929), and by the report of the League of Nations,¹ (1930), that there is first, the question of the accuracy of diagnosis, many cases may be included in the statistics which might never have been true poliomyelitis, and secondly, the variation in the case fatality rate due to the rise and fall in virulence of the

disease during an epidemic, since the prognosis for a case treated during the height of an epidemic may be entirely different from that treated during either the beginning or the end. Unless alternate cases are left untreated it is difficult to make any correct statements as to the efficacy of the treatment. Kellogg states, for instance, that in Alameda County, California, during the 1927 epidemic, 121 patients were given practically no serum. Six of these died, about five per cent. On the other hand, the mortality in Del Norte County was 28 per cent and that of Glenn County 31 per cent. The case fatality rate for the state at large was 18.25 per cent, showing that there must have been a great variation in the severity of the disease in different localities during the same epidemic.

Nevertheless, in spite of the lack of definite experimental evidence in favor of serum therapy for poliomyelitis, the general impression is that the use of human convalescent serum seems the most rational form of treatment, inasmuch as it can be shown to neutralize the virus upon injection of the mixture into a monkey. If used in as large a dose as possible during the preparalytic stage the chances are propitious for a favorable outcome.

PROPHYLAXIS

The only mention in the literature for the use of serum as a prophylactic in poliomyelitis have been the 1928 reports of Davide³⁹ in Sweden and of Flexner and Stewart⁴⁰ in the United States.

Davide injected five cubic centimeters of convalescent serum intramuscularly into seventy-three people less than twenty-five years old, leaving eighty-four uninoculated for controls. Of the controls fourteen developed poliomyelitis, with several abortive cases. Of the inoculated group, only one developed the disease. It may have been already acquired, however, as the patient came down forty hours after having the serum. The cases in this outbreak were all mild in type, so the test of the serum efficacy was not a severe one.

Flexner and Stewart do not present any experimental evidence in favor of serum prophylaxis but merely advocate its use in the event of a severe epidemic, on the basis of the in vitro neutralization tests. They recommend ten cubic centimeters subcutaneously for children and twenty cubic centimeters for adults, the injections to be repeated after four to six weeks if the epidemic persists.

HISTOLOGY

The most comprehensive recent account of the histology of experimental poliomyelitis is that of Hurst⁴¹ in 1929 at the Lister Institute, in which he concludes that poliomyelitis is "an inflammatory disease of the whole nervous system with especial involvement of the anterior horn-cells." Also that "the nerve cells are primarily affected by the virus and their degeneration is not attributable to the accompanying interstitial inflammation."

Later Fairbrother and Hurst⁴² have shown that in experimental poliomyelitis, the various

parts of the spinal cord are attacked almost simultaneously; that the virus spreads towards the brain and in the spinal cord along the axis cylinders, although meningeal propagation may also be possible, and that the primary lesion is in the nerve cells followed by inflammation of the interstitial tissue. They also show that the virus leaves the cerebral cortex at an early stage after inoculation and appears to spread along the nerve fibers.

George Williams Hooper Foundation, Second and Parnassus Avenues.

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ACUTE ANTERIOR POLIOMYELITIS— EPIDEMIC IN CALIFORNIA

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ACUTE anterior poliomyelitis, commonly known as infantile paralysis, is epidemic in California at the present time. The situation is worthy of serious consideration. To date this year, 238 cases have been reported: January, 17; February, 3; March, 12; April, 16; May, 59; June, 131 (first three weeks).

Many cases are not recognized as acute anterior poliomyelitis since diagnosis in the systemic stage can seldom be made except in the presence of an epidemic. This article is presented so as to urge the health officers to seek the cooperation of the physicians and place under control all suspicious cases with the least possible delay.

It has been observed that in those years when poliomyelitis becomes unusually prevalent in the late spring and early summer, there is nearly always an extensive outbreak of the disease in the late summer and early fall, when, under normal conditions, the disease is seasonally more prevalent. *The prompt institution of control measures at the present time, therefore, is of the utmost importance in order that the chances for a widespread epidemic during the coming fall may be minimized.*

Poliomyelitis, perhaps, is one of the most common of the communicable diseases. Since paralysis occurs in but a small percentage of cases, proper diagnosis is very often not made. Whenever the disease becomes epidemic, all cases of sudden, acute illness in children must be regarded with suspicion. It should be remembered that poliomyelitis is not essentially a disease of the central nervous system. It is only in a relatively small number of cases that there is any invasion of the central nervous system. Paralysis is purely an accidental and incidental occurrence and, in reality, it occurs rarely. Seventy or eighty per cent of all cases of this disease present merely the aspect of an acute generalized affection without sign of injury to the central nervous system. Environment and social conditions have little bearing upon the appearance of the disease, and it occurs as commonly in sparsely settled rural districts as in crowded cities. It is caused by a filterable virus which is unknown apart from infected human beings. This virus possesses a high degree of resistance, both to cold and to ordinary degrees of heat, for long periods of time. If enclosed in albuminous matter it withstands drying quite readily. Since it can withstand both moist

and dry conditions, it can easily be carried into the respiratory tract as a spray produced by coughing, sneezing, etc. It is doubtful if agents other than man play any conspicuous part in the transmission of the disease. Poliomyelitis is a human-borne, contagious infection, with its portal of entry in the upper respiratory tract, especially in the nasopharyngeal mucous membrane.

For the sake of safety, cases of severe intestinal disturbances or of common colds, occurring especially in young children, at the present time should be regarded with suspicion. They should, accordingly, be isolated without delay and isolation should be maintained at least until the nature of the illness is definitely determined. The age of the patient should not be considered in making diagnosis. While most cases occur in young children, many adolescents and young adults are attacked. The younger children seem to weather the acute stages better than adolescents and young adults, among whom the death rate is especially high. Since the adult carrier is known to play an important part in the transmission of the disease, it is important that whenever a case of poliomyelitis occurs in a family, all members, as well as other contacts, be isolated for two weeks, as required under the regulations of the California Department of Public Health. Cases of poliomyelitis must be quarantined for a period of three weeks.

For your information, a brief outline of the disease is appended:

The classification of poliomyelitis, which is most useful from a clinical standpoint in that it gives the different forms as they are met with in practice, is as follows:

1. The spinal poliomyelitic form.
2. The meningitic.
3. The encephalitic.
4. The form resembling Landry's paralysis.
5. The abortive.
6. The bulbar or pontine form.
7. The ataxic.
8. The polyneuritic (resembling neuritis).

The spinal poliomyelitic form is the common form which is generally encountered. The meningitic form is very fatal, and the paralysis which accompanies it is of the spastic rather than the flaccid type. Frequently this form can only be differentiated from meningitis by making spinal puncture and finding the specific organisms of meningitis in the spinal fluid.

Those cases showing early paralysis of the laryngeal muscles offer great difficulty in differential diagnosis between poliomyelitis and diphtheritic paralysis. Many of these cases of throat paralysis develop paralysis of the muscles of respiration, and practically all terminate fatally.

The encephalitic type must be distinguished from the so-called sleeping sickness or encephalitis. The type resembling Landry's or ascending paralysis is not so difficult of diagnosis as the early paralysis is in the lower extremities, the paralysis gradually extending to the muscles of the trunk and upper extremities. The so-called abortive (nonparalytic) type is probably the most dangerous type from the health officer's standpoint. It can be safely said that for every paralytic case which is encountered, there have been fifteen cases of the nonparalytic type.

Onset (Systemic Phase).—The disease begins suddenly, with fever as the most common single symptom and the fever may be any grade. There is generally pain or tenderness in the back of the neck, back, arms, and legs. In young children, vomiting and diarrhea may usher in the attack, although constipation is more often present. In older children, headache and muscle pains are generally found. Sometimes the first symptom is that of lassitude or drowsiness; sometimes interrupted by periods of great restlessness or even convulsions. Sore throat is not uncommon.

While the systemic symptoms are merely those which may occur in any sick child and may pass off without a definite diagnosis being made, the com-

bination of fever, vomiting, constipation, drowsiness, and irritability, especially when combined with headache, a transient flushing of the face, abnormal sweating, or retention of urine, justifies the tentative diagnosis of poliomyelitis if frank cases are occurring in the vicinity.

The Paralytic Stage.—After the systemic phase, lasting a few days at the most, there may be a period of improvement, or the disease may go directly into the paralytic stage. In about 75 per cent of the cases in which paralysis appears, it comes on or before the fourth day of illness. Sometimes the paralysis can be discovered only by careful searching. It may be limited to a single muscle or a part of a single muscle, a group of muscles, or it may be general. In most cases the paralysis is partial rather than complete.

Treatment.—The treatment in the early stage of the disease, that is, when the temperature is elevated and the patient suffering from pain and tenderness in the paralyzed part, *should be absolute rest only, and no active physical or mechanical interference whatsoever.* The many forms of massage and electrical treatment should be postponed until all constitutional symptoms have disappeared and the patient no longer suffers from pain or tenderness. *The only active treatment of a paralyzed limb during the acute stage should be rest of the part in such position that contractures cannot develop, in an effort to keep the limb in as normal condition as possible.* In hospital practice it is now the custom to place the paralyzed limbs in a plaster cast and keep the patient absolutely quiet.

Serum from recovered cases of poliomyelitis is used in the treatment of this disease. It is considered advisable to take blood from only the paralytic cases. This blood may be taken any time after the temperature has returned to normal and it has been taken as long as ten years after recovery. While whole blood may be given intramuscularly in emergencies, the recommendation is that at least fifty cubic centimeters of the convalescent serum (preferably a pooled serum) be given intramuscularly, as early in the course of the disease as possible. Health officers are urged to prepare a list of donors from the known paralytic cases in their territory and have the list available for those physicians requesting convalescent serum. When feasible, it is recommended that collecting stations be established.

THE LURE OF MEDICAL HISTORY

SIXTEENTH CENTURY GERMAN MEDICINE*

Artzneybuch of Hofmedicus Gäbelthouer

PART II

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European and American literatures have many passages confirming the authenticity of the remedies quoted in Part I of this article from the sixteenth century Dr. Gäbelthouer, court physician to the Duke of Württemberg. Shakespeare scholars can think of some, I am sure, and wide reading will convince the most skeptical that the witches of *Macbeth* were truer to real life than the modern reader suspects. Coming down to

* Part I of this paper, giving the introductory comments on the book under review, was printed in the July issue of *California and Western Medicine*, page 508. To understand the prescriptions here given, it is desirable to read Part I of this paper. The book referred to is the "Artzneybuch" of Hofmedicus Gäbelthouer, printed at Tübingen, Germany, in 1596. Brackets as used in this article are insertions by the translator.

later allusions, I can think of none more direct than that of Doctor Faustus himself:

Faust:

This was the medicine! The patient's woes soon ended,
And none demanded, Who got well?
Thus we, our hellish boluses compounding,
Among these vales and hills surrounding,
Worse than the pestilence, have passed.
Thousands were done to death from poison of my giving;
And I must hear, by all the living,
The shameless murderers praised at last!

(Bayard Taylor's translation.)

Goethe's *Faust* is, of course, modern-minded and hence unrepresentative of the attitude of real medieval minds, whether functioning in the sixteenth or the twentieth century. So *Faust's* self-condemnation must be viewed as a true modern views everything, in its proper historical perspective. Thus viewed, the criticism is too harsh, for though the boluses were, as *Faust* says, hellish, the murderers were not shameless but perhaps as sincere as modern physicians. Otherwise, there would be no warrant for printing this article under the above heading of "medical history."

Before proceeding with the recipes, one word more, in regard to the reader's probable amazement at the mass and variety of the compounds, their apparent incongruity of combination, and the almost invariable preference for dozens of liquids and solids in a single prescription. Before letting his amazement run away with him, let the reader look around him today and see the many evidences of like practices in his own home town. If everything conceivable must somehow do service in good old Dr. Gabelthouer's prescriptions, and if all the fauna and flora of the countryside must contribute a share of them, perhaps the primary object was to impress the patient, and the psychological effect of mere quantity and variety may have been present to the Hofmedicus—who can say? But to continue:

SIXTEENTH CENTURY REMEDIES FOR EYE DISEASES

Diseases of the eye:

1. "For hot or swollen eyes, take the white of a new-laid egg, add white rosewater, three lentils, and some camphor; pound well in a clean mortar and make little cakes of the mixture, the size of a thaler; see that they are well moistened and apply to the eyes until the cake is dry; wet again and reapply until all the heat and pain are drawn out; much putrid matter will be drawn out, too."

2. "Temper the white of an egg with eel's blood, keep in a copper vessel, and apply warm under the suffering eye; this generally gives relief."

3. "Take the yolk of an egg, burn to powder, add woman's milk and honey, and apply. This is especially effective with *cataracts*."

4. "Take a pound of rosewater and honey, and a pound of whites of eggs, well clarified with a bath-sponge. [?]. Put into a green earthen pot well glazed; stir thoroughly; add nutmeg, nutmeg flower, clove, green copperas, ginger, and galanga, an equal portion (small quintal) of each, and pound well into a delicate powder. Seal the pot well with a clean soft cloth, and bury the pot deep in the earth for three days. On the third day dig it up, remove the cloth, clean it and

dry thoroughly; then with it apply the mixture to the eyes, anointing carefully. Permit an occasional drop to fall into the eye. This treatment will take away much of the *pain*."

5. "Take three eggs, boil them hard in vinegar; peel, and use the whites only. Add a clean boy's urine; stir the mixture well; squeeze through a cloth into a glass. Apply three times to the eyes and to the cephalic vein."

6. "As an *eye powder*, good for all ailments of the eye, especially for felon [?], take the white of a very hard-boiled egg—as hard as you can boil it—add the whole of a nut of nutmeg, with a little alum; pound till as fine as flour. A splendid eye remedy."

7. "If a foreign substance has lodged in your eye, or if someone has hit you in the eye, or thrown something into it, take milk from a woman still suckling a boy baby, about a spoonful; add the white of a new-laid egg; pound it well after adding white rosewater, fennel water, elder-blossom water, and Schnallenwasser [?], a spoonful of each; mix well with the milk and egg, and put into a clean glass. Have ready a pad of clean hemp; place it on a flat clean plate; pour from the glass enough of the mixture on it to moisten well; put on the injured eye; the pad must be large enough to cover both eyelids. Let lie until dry, then renew as often as needed, day and night, until a cure is effected. If the mixture is all used up, renew as before. This remedy has never failed; it is good and has long been used."

8. "Take some of the big flies that are found asleep on walls in the spring; cook them in water. Apply a few drops of the water to the corner of the eye *when-ever red*; apply at night before going to sleep."

9. "If the red eyes water heavily, take a tablespoonful of honey, a spoonful of salt, and a measure of your very best wine, or the best you can get; mix in a brass basin which can be closed so tightly that not a drop can escape. Every hour turn the vessel upside down, day and night for eight successive days. Then put the mixture into a blowing apparatus [?], stir well and let no steam escape. As long as the eyes are red, whenever they smart or sweat, apply some of the water to both corners of the eye with a soft feather. Be careful as to drafts of air."

10. "Take white rosewater, about a spoonful; mix with large mastic seeds; burn a wax candle and let the wax drip into the mixture. Then let stand, and see to it that the odor does not all escape. Drop this water frequently into the eyes. Then take the ground mastic, mix it with the white wax; make a candle out of it; burn it, then extinguish and let the smoke of it enter the eyes. This is especially helpful in *discharges from the eye*."

11. "Running eyes are helped by taking leaves and root of crowfoot, keeping these twenty-three hours in vinegar, then binding them to the elbows of both arms, keeping them on overnight until they draw large blisters. When these break, the flow from the eyes will be directed through the burst blisters and the cure will occur."

12. "Any pain in the eye is helped thus: take elderberries, crush them well, put into a vessel with vinegar, keep covered overnight in a cool cellar; then put in a can or other vessel and boil; when the steam rises, take from the fire and let the patient hold his face over the steam. While the mixture is still hot, apply some of it with a sponge to the eyes, washing them well. This is especially effective at night before going to bed, and on rising in the morning. Keep this up until relieved."

13. "The water which runs from the vine tendrils in the month of May when cut is highly effective against pains if some of it be put into the smarting eye."

14. "When pocks break into the eye, burn some linen cloth and place it overnight on an anvil or some other steel; in the morning you will find some drops on it; apply these with a feather to the affected eye and it will effect a cure. Duke Frederic of Saxony

learned of this remedy from a heathen in the Holy Land and has tried it successfully again and again."

15. "Take a new unglazed earthen pot, put into it elderberries burned to powder, and keep unsealed until quite cold. Then blow some of the powder into the patient's eyes. Although this may make the eyes very sore for a while, the patient will not die of it so long as breath remains in his body, and eventually he will grow better."

16. "For *film over the eye* cut off the head of a black cat; mince it small; put into a pot, securely covered, and place in the bake-oven where the fire is the hottest. Let it remain there until all the bread is baked and the oven has grown cold, then remove and pulverize in a mortar. Every morning put some of the powder in the eye right onto the film. Keep it up until a cure is effected."

17. "Ear wax smeared over it is also excellent for *film in the eye*. It is also effective against smarting and itching of eyes anointed with it."

18. "An excellent *eye remedy* is one made of operculate snail. In the month of May secure a number of these snails in their white shells. Keep them several days in a vessel where they will lose their filth. Now put them in another, but unglazed, new pot, placing the shells on their backs. Fill the shells with about as much salt as if you were salting meat—rows and rows of snails, all similarly salted, until the pot is filled with them. Cover with a well-fitting top, solidly glued down. Put into a hot oven, preferably a bake-oven. Bake until the contents are reduced to ashes; a gray powder will be the result, though occasionally it may be black. Keep this powder in a soft clean cloth, and put some of it into the eye whenever there is *pain*, and hold the eyelid until water runs out of the eye. Or apply some of the powder in quail grease with a soft feather. If that does not help, mix some of the powder with good white wine to which some honey and a few pence worth of Spongrün [?] has been added, after having been well stirred in a brass mortar and thoroughly blended. Every night put some of this into the eye until the pain disappears."

19. "Take butter made of woman's milk, to which some prepared sal-ammoniac has been added in equal proportion; mix into a salve and anoint the eye."

20. "For *dim eyes*, take the eggs of red ants; pound well into a black dough; bake in a loaf like bread. After it has grown cold, mix with water and apply a few drops to the dim eyes, which will quickly have their sight restored. This remedy is also effective with animals."

21. "*Dim eyes* are also helped by a mixture of honey with the gall of a rooster, rubbed into the eye. If kept up for a considerable time, your eyes will remain bright forever. Some add gall of hare and eel, and are enthusiastic over results."

22. "A mixture of fennel, rue, eye-bright, vervain, endive, nightshade, pepperwort, and wormwood, a handful of each (since you will need a lot of it) is highly recommended for all the *ills which the eyes may bring* on you. But this remedy should be prepared in the month of May. Chop the herbs as fine as you can, put into a tin vessel, pour old white wine upon it, and add fine pure honey. Then add the urine of a two or three-year-old boy until the herbs are covered with the fluid. Cover carefully and let none of the aroma escape. Let stand in a cool place for eight or ten days. Now distil in glasses three times: the first time off the herbs, then twice the water alone. Keep the fluid in well-sealed glasses, as this mixture is worth its weight in gold for *every affliction of the eye, with the exception of cataract and glaucoma*. Use in the morning on an empty stomach, and at night before you eat supper, and again before you go to bed—a few drops put into the eye with the finger or a fine feather; put into the corner of the eye, the head held well back, working the eyelids up and down so as to reach every part of the eye."

23. "In order to avoid spectacles, take the milk of a woman suckling a boy baby, about three table-

spoonfuls, and about the same quantity of her baby's urine; mix with the white of a new-laid egg and a small quantity of camphor. Put all into a pot, heat in the oven, and apply on a blue linen cloth to the eye, keeping it there overnight. Repeat three nights in succession every three months."

24. "A splendid *eye water* is made as follows: Place some honey in a narrow bottle; leave the open bottle in an ant heap of large ants overnight; by morning the ants will fill the bottle. Cork the bottle. Take dough and enclose the bottle in it; bake in the oven, longer than ordinary bread. This will result in some water in the bottle, which is the very best healing fluid, for it will cure every affliction of the eye."

25. "If blinded by *cataract*, take a goodly quantity of crickets, crush in a clean mortar, and squeeze the juice through a cloth. Apply to the eyes three times a day, one drop only, morning, noon, and night, until sight is restored."

26. "If you have *crab-lice* in your eyebrows, take some silver leaf of the sort used by silversmiths; apply to the eyebrows and the lice will fall out. If your eyebrows are full of mites, take a quantity of ginger nuts and pulverize; now take a slice of bacon, light it and let the fat trickle onto the powder; knead to a salve, and apply frequently. This will not only kill the mites but destroy their nits as well. Or boil a new-laid egg in hot ashes as hard as possible; peel while hot and put into a clean white cloth; hold to your eyebrows as hot as you can stand it. That will surely kill all the lice, mites, and nits."

SIXTEENTH CENTURY REMEDIES FOR EAR, NOSE, AND THROAT DISEASES

Turning now to *diseases of the ear*, the remedies are cheerfully recommended, but there is none guaranteed to be infallible—such is the scientific rigor of the book.

1. "For the *hard of hearing*, frequently apply quinces, cut in two, to the ears, and you will soon note improvement."

2. "Or take gall of rabbit, and of a pickerel; mix them with the fat of woman's milk. Rub the ears with the mixture and put some of it inside, too."

3. "For *ear noises*, take some nutmeg, pulverize, add vinegar and water, and put a few drops of the mixture into the ears."

4. "For any *difficulty of hearing* the following will prove helpful: Get a lot of ant eggs, add olive oil and the fat from the hoofs of oxen; place in a clean cloth and squeeze through. The resultant salve is not only a good remedy for ear troubles, but will cause foreign substances to fall out if applied frequently."

5. "Fat from marmots, allowed to trickle into the ear, will likewise prove helpful."

6. "Juice of onions mixed with honey and a few drops of urine from a pup yet too young to lift its hind legs is an excellent remedy for *ear troubles*."

7. "Or take a large eel; put it while still alive into a pot of water, and boil well. To the resultant fat add the juice from a part of a leek and let stand a while. Then apply a few drops, getting them well into the ears, which cover with a clean white cloth. Now get hot loaves of bread and hold to the ears as hot as they come from the oven, until cold. That will surely help."

8. "Black Christmas-flowers, freshly secured and mashed, will give you a juice which, trickled into the ears, will prove healing. The roots of these flowers, mashed fine after being well dried, with a little water added, a bit of camphor, and some woman's milk, will give you a mixture which, put into the ears, has helped many a person for *all sorts of ear troubles*."

9. "For any *pain in the ear*, take an old oil-jug, moisten inside, and place in it some pulverized sulphur. Hold over hot coals until the sulphur melts; then let the fumes enter the ears."

10. "If *fever* has set in, mix equal portions of juice of leek, woman's milk, and rosewater; dip a cotton tampon into the mixture and bind over the aching ear."

11. "For *worms in the ear*, get a horseshoe from the smithy; heat well; put onion seeds on it; add a few drops of vinegar; cover with a funnel and let the steam enter the ear. That will kill the worms instantly."

12. "Or take an apple with an especially appealing fragrance; bake it, and hold it to the ear while hot. That will fetch the worm, attracted by the aroma."

13. "Or take urine from the sufferer, add a handful of salt, stir well; moisten with it a four-fold cloth, and apply to the nape of the neck. With God's help, the worms will come out living, or it will kill them. If only a few of the worms should come out, the others refusing to follow, dry and pulverize the worms you have secured, add some strong brandy, and pour the mixture into the ears. That will help."

For nose-bleed:

1. "Take donkey's excrement, place in a cloth, and bind to the top of the sufferer's head; the flow of blood will cease."

2. "Or take a new felt hat, preferably black (though some prefer scarlet); cut it into very small pieces; add hog excrement; put the mixture into a new pot, cover tight and heat thoroughly. Now put into a blowing-apparatus (?) and burn to powder. Put aside and use whenever excessive *bleeding, from nose or other parts*, is to be stopped. This applies also to woman's too profuse menstruation. A good way to apply the mixture is with a sponge moistened with vinegar, to which the powder is added, then tucked into the nostrils or other bleeding parts."

3. "For any *festering wound in the nose*, get some electuary from the apothecary, moisten with strong vinegar, add a few pigeon droppings, and apply on a feather."

In regard to the teeth and gums:

1. "A good remedy for *toothache* is ground pepper. Apply as much as you can stand. Not only will this lessen the pain but also cause the teeth to grow hard and white and banish offensive odor. The pepper should be placed between teeth and lips, keeping the mouth closed until the burning and smarting has ceased. Afterwards make sure to wash out your mouth well."

2. "Or mix mustard seed with black pepper, grind very fine, and boil in strong vinegar. Rinse your mouth well with the mixture."

3. "Or take a pound each of burnt and unburnt alum, pulverize, put into a blowing-apparatus, distil a water from it, to which add equal quantities of juice from cornflowers, columbine, and sage, well mixed in a glass; then add ground nutmeg and myrrh; let stand in the sun nine days, then put away safely, for it will keep for many years strong and effective. Wash your teeth well with this mixture twice a week and it will banish pain, prevent any ooze of fetid matter, and whiten the molars."

4. "For *worms in the teeth*, take a powder made of henbane, mix with wax and shape into a candle, and use as such. But be careful, for the henbane smoke is apt to make you dull and dizzy, though it may do no especial harm if you are naturally dull."

5. "For *loose teeth*, mix powdered root of mastic tree with alum and add rosewater; of this make a plaster and apply to the wobbly tooth. It will strengthen it."

6. "For *putrid or bleeding gums*, secure bones from salmon, preferably Rhine salmon, burn, and grind to powder; add a little burnt salt; mix with your own spittle. Rub the mixture well into the gums and over the teeth. It will not only help the affected gums but will keep your teeth sound and white as well."

7. "*Ill-smelling and hollow teeth* are helped with a mixture of honey, nutmeg, and sage, the latter two well ground so that you get a soft salve; with this the teeth are treated. An addition of ground mastic-root and myrrh, a drachm of each, will prove yet more effective. Best of all is to boil all these thoroughly in good red wine. Use as a mouth wash night and morning."

8. "Rub your teeth frequently with a mixture of barley-flour, honey, and salt. This will *turn them from an ugly yellow to a bright white*."

9. "Or use lentils and nut shells, burnt to powder."

10. "Or take barley-flour, knead into a loaf, and bake it until it turns to a black coal; powder fine and rub your teeth with it frequently. They will turn beautifully white."

For sore throat:

"Boil in a brass vessel equal quantities of the juice of mulberries and blackberries; when it first comes to a boil, add a pound of honey; remove from fire when of the consistency of cherry juice. This makes an electuary for simple sore throat, to be used as a gargle, a spoonful at a time. But if the trouble is aggravated by severely *swollen tonsils*, add juice of plantain leaves, sage, and elder blossoms, three spoonfuls of each, heated slowly together in a tin vessel; add a spoonful of rose vinegar. Heat the electuary well every time before using, and gargle as hot as you can bear it. This will remove the soreness and prove a thorough cleanser."

"For *sores in the mouth*, and even holes in the neck, take half an ounce each of alum, myrrh, and mastic, add some burnt hartshorn; mix; pulverize; make into a salve with rose honey. Apply to the sores frequently, and you may even swallow some of the salve, but not more than the size of a hazelnut."

"Camomile blossoms heated in vinegar and bound while yet warm about the neck will always prove helpful for *sore throat and swellings of the neck*."

"Or take a whole swallow's nest, pulverize thoroughly, boil in wine; this substance, of the consistency of porridge, bind while yet hot in a clean cloth about the neck; continue to heat the bandage, as hot as the patient can stand it. Whenever the mixture grows too dry, renew it. If you can secure some live young swallows with the nest, so much the better. My own practice has been to get two young swallows with the nest, at about the age when they begin to get feathers, cut them open in a straight line down the back, including the head; then salt them well and hang them in the chimney: feathers, entrails, and all. I remove nothing whatever, and let them hang in the smoke for a solid year until good and dry."

"For *frog in your throat* [curiously enough, this expression literally occurs: 'Frosch im Hals'] take equal quantities of old grease and soap, pound well together, heat well, and smear your neck with the mixture. Stay in a warm room, and see to it that your neck is well covered with a warm kerchief."

"For *quinsy*, take several live crawfish, pound them up well; put some of the mixture in a white, clean, but rough linen cloth; rub the patient's tongue with it frequently. Have a number of cloths handy, for you must use a fresh clean one for each rubbing."

"A simpler remedy is to cut a rind of bacon of about the thickness of the back of a knife and about as broad as the tongue, on which it is to be laid until the fat melts off, which will cause the burnt skin of the tongue to peel off."

"For *inflammation of the uvula*, take an empty snail shell, powder, add an equal quantity of well-roasted salt, boil in fresh water; gargle the mixture frequently."

"For *hoarseness*, mash some garlic, drain off the juice, to which add two or three spoonfuls of honey; take a spoonful of the mixture mornings on an empty stomach."

"To banish *goiter*, take equal quantities of salt, soap, vinegar, and horseradish juice; mix, and keep overnight. Put some of it into a leather bandage and bind on. It will help."

"Or, take a horse's hoof, bake till charred in a new pot; grind to powder; mix with oil. Use this salve frequently."

"The blood of a weasel, smeared frequently over the goiter, will also banish it eventually."

SIXTEENTH CENTURY REMEDIES FOR HEART DISEASES

Heart disease:

"For *weak heart*, or *palpitation of the heart*, or any heart trouble, nothing is better than good wine, quantities of it, frequently resorted to. A few coins of fine gold placed in the wine vessel will add to the wine's effectiveness."

"Another splendid *heart remedy* consists of a mixture [whether raw or cooked is not stated] of fox tongue and wolf liver, to which is added nutmeg, cinnamon, ginger, and sugar, well mixed. Take a small quantity every two hours."

"For *fainting spells*, take equal quantities of numia [?], nutmeg flowers, and castoreum, in brandy or cinnamon water. That will restore the patient [even ?] if he is half dead."

Pains or stitches in the side:

"Grind to a fine powder the tooth of a wild boar; add scabiosa water and a few drops of oil of almond. Drink a small quantity, hot, frequently. This is by far the best remedy for all *sharp pains in the side*. You may add a plaster, laid on the aching side, made of a mixture of the excrement of a white dog well kneaded with wheat flour and honey and then boiled in goat's milk. While yet hot, put some of the mixture into a leather bandage and apply. Keep your fire going and renew the plaster as hot as the patient can stand it."

SIXTEENTH CENTURY REMEDIES FOR LUNG DISEASES

Coughs:

"Use milk, preferably goat's milk, sweetened. Gargle it and drink it, both."

"Or, take a large onion, hollow it and fill with honey; boil, adding some wine. Squeeze the juice through a clean cloth; drink some of it continually. Be careful to keep out of cold drafts."

"As a powder, take the lung of a fox; wash well in wine, dry, and powder fine. Use a small quantity from time to time."

"For all *lung trouble*, the milt (spleen) of a very black young sucking calf is excellent. Dry in the oven and powder fine. Two spoonfuls in warm beer mornings on an empty stomach, and at night before retiring. Improvement usually sets in within two or three weeks."

"The lung of a young sucking calf is almost equally effective, used similarly. Fox lung is even better. It is also effective in *difficulties of breathing*."

"In very bad cases of *pulmonary trouble*, use crawfish, secured living and pounded fine while still alive; add very hot wine, and squeeze the juice through a cloth; take on an empty stomach mornings, a small quantity, and at night before retiring, for at least three weeks."

"Onions, boiled until quite soft and put while very hot into a leather bandage or thick cloth and applied to the breast will prove additionally helpful."

"Where *difficulties of breathing* accompany the malady, take a large sponge, moisten in vinegar or wine, or even cold water; bind about mouth and nose, and breathing will grow easier."

University of California at Los Angeles.

(To be Concluded)

CLINICAL NOTES AND CASE REPORTS

A LARGE PORK BONE IN THE BRONCHUS*

REPORT OF CASE

By H. J. HARA, M. D.
Los Angeles

THAT foreign bodies, both of organic and inorganic substances, of various sizes and shapes, find their way into the air passage is well known. But that such a large object as is shown in the illustration should have lodged in the bronchus for a month and been unrecognized even after an examination, has prompted me to report the following.

REPORT OF CASE

Mrs. G. H., age twenty-eight, native of Canada, housewife, was referred by Dr. E. J. Steen of Fullerton, with the possible diagnosis of a foreign body in the air passage. She was admitted to the White Memorial Hospital on November 12, 1929, under my service. The patient stated that a month before she had had a choking and gagging spell while eating her supper, which consisted of mashed potatoes and gravy made from the fat in which she prepared the pork chops that evening. At the time she felt a sudden, sharp episternal pain that compelled her to leave the table. The cough and dyspnea persisted during the night and all of the next day. On the third day the above symptoms still persisted, and in the absence of her family physician she consulted another who, after examining her, dismissed her, stating that she probably had a "cold" and that she would be well in a few days, apparently having overlooked (1) the history of choking and gagging at the time of her accident; and (2) subsequent development of persistent cough, blood-streaked expectoration, low-grade septic temperature, and slight dyspnea in a previously well person immediately after the accident, all of which unmistakably point to the presence of a foreign body in the air passage.

Having failed to recover from her "cold" for a month, she consulted her own physician who by this time had returned from his trip. The roentgenograms made by him revealed nothing of definite nature.

Upon her admission to the hospital the routine physical examination was performed by the resident internist, Dr. Albert M. Bond. The usual sign of limitation of expansion of the invaded lung was absent. The asthmatoic wheeze was barely recognized. But on account of the definite history an exploratory bronchoscopy was performed under local anesthesia after the Jackson technique. The large fragment of bone was encountered just below the carina, being transfixed in the swollen mucosa of the right main bronchus in its posterior wall, which was bathed in mucopurulent secretion. With little difficulty the side-curved forceps were applied and the object was brought to the subglottic region; then alligator forceps were substituted through the laryngoscope, and the invader was delivered through the glottic chink. The bone measured 25x14x5 millimeters. The first day of the operation the patient's highest temperature was 100 F., but soon it subsided and remained so until the time of her discharge the next day.



Fig. 1.—Pork bone lodged in right main bronchus for four weeks.

*From the Department of Laryngology, White Memorial Clinic, the College of Medical Evangelists, Los Angeles.

In a recent communication she stated that she was well, except for a slight pain over the left shoulder which apparently had no connection with the foreign-body incidence.

SUMMARY

1. This case forcibly impresses upon us the reliability of the history of the accident in all foreign-body cases.

2. That the negative roentgenogram is not in itself proof of absence of usual radio-opaque substance like pork bone.

3. That exploratory bronchoscopy is indicated in every doubtful foreign-body case; and,

4. That the human glottic chink is capable of admitting a large-sized foreign body.

432 South Boyle Avenue.

RUDIMENTARY GALL BLADDER AND CONGENITALLY ABSENT COMMON DUCT

REPORT OF CASE

By J. M. FRAWLEY, M. D., *Fresno*

AND

STANLEY H. MENTZER, M. D., *San Francisco*

MARTHA T., an American child, three months of age, was admitted to the Fresno General Hospital because of gradually increasing yellow color of the skin.

The jaundice was not noticed until the baby was at least a month old. Labor was normal; there was no asphyxia. The birth weight was six pounds.

The breast was given for three weeks, then a cow's milk mixture which was not tolerated, and for the last three weeks before admission she had been getting sweetened condensed milk.

When admitted to the hospital there was a marked icterus of the skin and sclerae. The liver was greatly enlarged, emaciation was considerable, and the child's weight was five pounds, thirteen and one-half ounces. The red cells of the blood were 4,150,000 per cubic millimeter; the white cells, 16,000. The blood smear was essentially normal.

The Wassermann was negative, both for the child and the mother. The urine was acid, yellow in color, and showed a trace of albumin.

The stool was white and had the appearance of milk curd. It showed no trace of bile.

The serum was bile-colored and gave a prompt van den Bergh reaction.

There was no increased fragility of the red cells.

Ladd¹ in 1928 reported histories of nine infants, five months or younger, with atresia of the bile duct. In these cases operation was done with recovery in

four cases. Encouraged by these results, operation was performed in this case by Dr. J. H. Pettis. No trace of the gall bladder or common bile duct could be found, and therefore it was impossible to do the plastic operation described by Ladd.

In our case autopsy two days later, the liver was found greatly enlarged and dark green in color. The gall bladder was present, but only about one-tenth of its normal size. There was a true cystic duct which joined the right hepatic duct to form a blind stump one centimeter in length. There was no communication or even rudimentary fibrous cord between this stump and the duodenum. The pancreatic ducts were present and patent.

SUMMARY

A case of congenital absence of the common bile duct is reported. The findings are unusual because:

1. The common bile duct was completely absent, except for a patent stump one centimeter long.

2. The gall bladder was rudimentary and the cystic duct drained into the right hepatic duct instead of the common duct.

Patterson Building, Fresno.
450 Sutter Street, San Francisco.

REFERENCE

1. Journal American Medical Association, 1928, Vol. 91, p. 1082.

AGRANULOCYTIC LEUKOPENIA IN RELATION TO ACUTE FEBRILE UPPER RESPIRATORY INFECTION

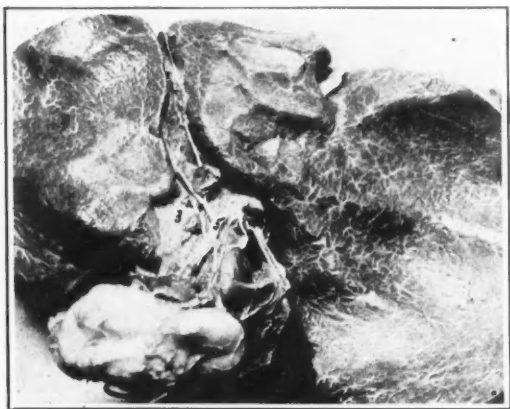
REPORT OF CASE

By EUGENE R. LEWIS, M. D.
Los Angeles

THE first reference I have found to agranulocytosis is Schultz in 1922. Subsequent cases have been reported by various observers, Kastlin collecting forty cases in 1927; Linthicum, Uren, and others reporting additional single cases since. Many of these cases have been anginas in which the main bacteriologic factor has been the *Bacillus pyocyaneus*, although symbiosis of Vincent, the colon bacillus and various strepto- and staphylococci have been reported. While it is apparently possible in any individual, the mass of clinical evidence points to its typical incidence in middle age, and the female sex.

In the literature on this subject there is found nothing significant in the history. The disease is usually of sudden onset, often with chill, fever, malaise, and sore throat, and is usually rapidly fatal. The clinical course of the disease is characterized by general signs of illness out of proportion to local pathology; temperature and pulse rate are high, asthenia and depression are marked, local swelling, edema, and sloughing sometimes ultimately extensive; the first differential blood cell count reveals leukopenia, with disproportionately low granular and polymorphonuclear counts. Eventually the white cells may fall below 500, and in exceptional cases, below 100, with absence of polymorphonuclears and granulocytes.

Uren has compared the pictures of agranulocytic leukopenia and infectious mononucleosis, which is more apt to occur in younger individuals. There is a white cell count between 7500 and 15,000, with increase of mononuclear and decrease of granular cells. Its clinical course is mild and recovery is the rule.



1. Remnant gall bladder. 2. Cystic duct. 3. Right hepatic duct. 4. Stump of common duct. 5. Portal vein. 6. Hepatic artery.

REPORT OF CASE

On November 30, 1928, I was called to see Mrs. B. H., a young married woman, aet. 35. Previous health had been frequently below par, but only vague complaints could be elicited. Tuberculosis had been repeatedly excluded; gastro-intestinal, respiratory, and endocrine studies had never revealed overt pathology. She had had one normal pregnancy, and for a year or two previous to this illness she had been in good flesh and strength. The day before I saw her she had noticed sore throat, general malaise, and aching. Her pulse on first examination was 92, temperature 100.8; tongue slightly coated, pharynx red, nasal mucosa congested, and there was mild tracheobronchial irritation. No râles or chest symptoms, no abnormalities of heart or circulation, abdomen or extremities noted on casual inspection; blood pressure was 98/70. Chief complaints were headache, general pains, sore throat, and weakness. She was put to bed on fluid alkalization and hot fomentations. The following forty-eight hours the clinical picture remained about the same, temperature ranging higher, but less headache and cough.

On December 2 the blood picture was: white blood cells, 1600—45 per cent polymorphonuclears, 50 per cent lymphocytes, and 5 per cent transitional.

	White Cells	Polys.	Lymph.	Trans.
December 3.....	1400	37%	50%	4%
December 4.....	600	40%	55%	5%
December 5.....	1500	26%	68%	6%
December 6.....	1400	43%	55%	2%
December 7.....	1600	25%	73%	2%
December 8.....	2300	25%	73%	2%
December 9.....	3600	24%	73%	3%
December 10.....	2500	52%	47%	2%

After December 10, the white count rose gradually, reaching 6200 by December 16, with 62 per cent polymorphonuclears and 37 per cent lymphocytes. No correlation seen at any time between the daily blood count and the clinical condition. On December 2 and 4, with 1600 white cells, 43 per cent polymorphonuclears; and 600, 25 per cent polymorphonuclears, respectively, the patient experienced profound improvement. The accuracy and reliability of all blood counts was carefully rechecked and is unquestionable. The clinical course was satisfactory in every respect from the start. Throat symptoms, cough, headache, and general discomfort subsided gradually, with no new developments. At the end of the eighth day, temperature reached normal; the white count rose gradually; The patient made a complete recovery and has remained well for nine months.

COMMENT

At the time this case occurred there were many cases of acute "grip" or so-called "flu"—not sufficient to warrant the term "an epidemic," however. The white counts of fifteen or twenty clinically similar cases at this time were between 7500 to 20,000, with granular cells and polymorphonuclear cells present in the usual propor-

tions. Inquiry revealed a few cases of moderate leukopenia at this time in patients of other physicians—none below 5000, and none with falling granulocyte and polymorphonuclear cell counts.

This case fails to support the usually accepted thought that the white and differential count sheds definite light on the reaction of the individual's mechanism of resistance to the present infectious invasion; and also gives some indication of the measure of acquisition of immediate immunity to that infection.

1154 Roosevelt Building.

A NEW KNEE BANDAGE

By MAST WOLFSON, M. D.
San Francisco

FOR knee injuries many devices and bandages for ambulatory treatment have been made. These have ranged from simple covering with the elastic knee bandage to the more intricate metal braces.

The object of this article is to report and describe a bandage which has been useful in the hands of the author in the treatment of some acute and chronic knee injuries.

This bandage is essentially the old figure eight bandage, made out of four-inch flannel. It must be made to order for each knee treated so as to conform exactly to the patient's contour. After several layers of bandage have been placed snugly about the knee in a figure eight, they are pinned in position and basted there. In the middle of the external surfaces the bandage is cut between longitudinal bastings. Machine stitching and cross stitching now take the place of the bastings, and reinforcements of strong cloth are made about the edges. A tongue is placed within the bandage.

Four special toothless buckles are placed on the cut edge—two above the knee-joint, and two below it; with these the patient can slip it on and off and tighten the bandage where it is necessary. The line of force of the figure eight bandage remains constant (see plates 1 and 2). Pressure pads may be placed over various areas inside the bandage if needed.

This bandage has proved effective, comfortable, and warm. It is inexpensive and easily washed. Complete flexion of the knee is possible without distorting the bandage.

490 Post Street.



Plate 1



Plate 2

Illustration of new knee bandage

BEDSIDE MEDICINE FOR BEDSIDE DOCTORS

An open forum for brief discussions of the workaday problems of the bedside doctor. Suggestions for subjects for discussion invited.

X-RAY BURNS

JOHN M. REHFISCH, SAN FRANCISCO.—The day of the x-ray burn as a relatively common clinical entity is over. Most roentgenologists go on for year after year without seeing any burns, and when they do occur they are almost invariably the result of negligence. It is pretty nearly always true as the lawyers regrettably say, *res ipsa loquitur*.

Modern equipment with easily measured, accurately controllable and uniformly constant output of x-rays have taken the gamble out of the physical problems of dosage. The biological factors remain as the only imponderables and while it is unquestionably true that sensibility to radiation differs widely, a true idiosyncrasy must be extremely rare. Ordinarily the biological factor of safety is extremely wide—and the dose of filtered radiation which will cause a mild erythema may be very much increased without the occurrence of a dangerous burn. There is less margin in unfiltered radiation; but it is probably true that except in very minute areas where the caustic effect of the ray is desirable there is nothing the unfiltered ray can do that the filtered will not do as well or better. When one considers the greatly increased safety with which one works, if he has a filter there seems to be little excuse save that of economy of time for dispensing with it even in superficial lesions. When the inevitable mistake in dosage does occur, its results are usually negligible if a filter has been in place—they are nearly always shocking if it has not.

The accidental omission of a filter can be guarded against by any one of several methods—if, despite all precautions, such a catastrophe occurs, and a full dose is given, there is very little that can be done in the way of prophylaxis of the inevitable burn. It is advisable to apply some form of calamine lotion (the so-called Dodd's solution is probably the best) freely. The prognosis of the burn may be judged by the rapidity with which it develops. If it comes within the first few days, the outlook is very bad.

The outstanding clinical features of x-ray burns are that they are very painful and very indolent with little tendency to heal. Air-cooled ultraviolet radiation seems to stimulate the healing process at times. Usually, however, a surgical debridement well down into normal tissue should not be too long delayed. Unfortunately, the burns are frequently in situations where this procedure is technically impossible and then the

healing process may take months or years with a frail and brittle scar especially prone to become epitheliomatous.

There is no condition in which the old saying that prevention is better than cure is more true than in x-ray burns. And there is no condition in which prevention is easier or in which cure is more tedious and difficult.

* * *

SAMUEL AYRES, JR., AND NELSON P. ANDERSON, LOS ANGELES.—The most distressing and disfiguring type of "burn" which the dermatologist is called upon to treat is that produced by roentgen rays or radium. These causative agents produce their effects from one or two massive doses or as the result of the cumulative effect of many small doses.

The appearance of such radiation sequelae varies from days to months and even years. In the acute type erythema appears in two to fourteen days and may be followed by pigmentation (freckling) and desquamation. Subjectively slight burning, stinging or itching sensations may be present. If the reaction is more profound a pronounced redness occurs, and either superficial or deep vesicles may appear associated with moderate or marked swelling of the area, which process may go on to erosion, excoriation and weeping, with the formation of a yellowish gray necrotic adherent pellicle. In more marked cases the deeper tissues (subcutaneous tissues and muscles) may be involved with the formation of deep, necrotic, exquisitely painful ulcers, the tissue about which is cyanotic and leathery with a brawny induration. These ulcers take months and years to heal and are often the site of a complicating prickle cell epithelioma.

In the chronic type of radiodermatitis, which is usually the result of many small repeated exposures, vesiculation and ulceration is rare. Pigmentation, either diffuse or as a freckling, occurs, followed by alopecia, atrophy, wrinkling, areas of depigmentation, and a disfiguring telangiectasia. Later ulcerations and hyperkeratotic "warts" may appear. These hyperkeratoses may be the sites of origin of prickle cell carcinomas. The epithelioma which occurs following overdosage of either roentgen rays or radium is always of the prickle cell (metastatic) type.

In the prophylaxis of radiodermatitis the following may be mentioned: Reactions should be avoided except in cases of malignancy. Small

fractional unfiltered doses of roentgen rays are sufficient in most dermatological conditions. The application of most local remedies to areas under treatment is fraught with danger because such remedies generally enhance the effect of these agents of radiation. Boric acid, vaseline, alcohol, calamine, bismuth, zinc oxide, ichthyol and magnesium carbonate are practically the only drugs that may safely be used with concomitant roentgen ray or radium treatment. The use of the roentgen ray in the treatment of hypertrichosis is mentioned only to be condemned, for it is absolutely impossible to destroy the hair roots by this means without eventually producing a thinned, atrophic, wrinkled, telangiectatic skin. The physician who uses these agents either for diagnosis or therapy should be adequately protected at all times and especially men doing considerable fluoroscopic work. Omission of the filter in deep roentgen ray therapy is always attended with disastrous sequelae.

The treatment of mild untoward reactions following the use of roentgen ray or radium consists in applying local soothing remedies such as lead and opium wash, or calamine and zinc. In the more severe types wet dressings of boric acid and normal saline or Pusey's calamine liniment may be used. Where ulceration has occurred frequently all local applications are useless. The continuous bath may be tried, but wide excision of the affected area by means of the endotherm knife is the treatment of choice.

In the more chronic type of radiodermatitis, prolonged exposure of the affected areas to the elements, (especially sun and wind), should be avoided. A person so affected should apply locally two or three times a day, for the rest of his life, a thin protective coating of some non-irritating oil or grease. Telangiectatic vessels may be destroyed by electrolysis if the involved area is small. All warty or hyperkeratotic lesions occurring in such areas, and especially those with a tendency to fissure or those of a "wet" type, should be destroyed by electrodesiccation. Ulcerating lesions should be destroyed by the endotherm knife and the resultant defect closed by skin grafts. The use of either roentgen ray or radium as curative agents in lesions (hyperkeratoses, x-ray cancers) which they themselves have produced is to be condemned. Ultra-violet radiation is of no value either in the prophylaxis or treatment of acute or chronic radiodermatitis and may at times do actual harm.

* * *

GEORGE WARREN PIERCE AND GERALD B. O'CONNOR, SAN FRANCISCO.—In our experience we have seen a considerable number of cases of chronic radiodermatitis. Doctor Ayres has drawn an accurate picture of this type with the "pigmentation, alopecia, atrophy, wrinkling, areas of

depigmentation, telangiectases and the later ulcerations and hyperkeratotic 'warts' which may finally be the sites of origin of prickle cell carcinomas." We have also seen a number of these cases which have been treated for some time with ultra-violet rays with no improvement. In the later stages we are of the opinion that complete removal of the affected area should be done, and the resultant defect be repaired. Modern reconstruction surgery can restore to normal almost any defect caused by x-ray burns and can replace the scar with normal skin and subcutaneous tissue, thus not only reconstructing the contours and removing the unsightly scars, but also acting as a prophylactic against malignancy. Even when these ulcers are healed by long and careful treatment they are sure to break down again from slight blows, exposure to the elements or even the alkali in soap.

We have recently reconstructed almost the entire face of a patient who was burned with x-ray (from treatment for hypertrichosis, at the hands of a lay operator in a beauty shop). The left cheek scar was replaced by a large flap from the chest and this was carried up in three stages, first to the left cheek, then over the chin and finally severed at its pedicle and this end used to cover the right cheek, supplying a smooth and natural skin to replace the pitted, pigmented and hyperkeratotic scar. Another case presented ulcerating areas covering almost the entire extensor surface of both forearms. The burn resulted from a technician's efforts to treat psoriasis. At operation the entire affected area was dissected out down to the deep fascia and the arms placed in plaster splints, windows were cut over the wounds and the areas grafted with split skin grafts. The results were excellent, but psoriatic patches appeared on the skin grafts, though they were grafted directly onto the deep fascia of the forearms.

We have had a considerable number of such burns of the hands and fingers in older members of the profession who sustained these burns in the early days of the roentgen ray when its destructive power was not known. Wolfe grafts to the fingers and in some cases tubed pedicle grafts gave healthy covering to the fingers and restored function which was previously limited.

We have seen some cases of such burns, though not to the ulcerative stage but only to the stage of depigmentation and telangiectases, where radiotherapy has been used for keloids. We favor the treatment of keloid by complete excision and reconstruction of the part and treatment by radium ten days after operation to prevent the recurrence of the keloid. The result after reconstruction is nearer the normal and the result is obtained so much quicker that we are sure this method has many advantages over the slow wearing down process of radiotherapy.

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Leaflet Regarding Rules of Publication.—California and Western Medicine has prepared a leaflet explaining its rules regarding publication. This leaflet gives suggestions on the preparation of manuscripts and of illustrations. It is suggested that contributors to this journal write to its office requesting a copy of this leaflet.

EDITORIALS

MEDICO-ECONOMIC PROBLEMS

Three Medico-Economic Articles in the July Issue of CALIFORNIA AND WESTERN MEDICINE.

—Last month's issue of CALIFORNIA AND WESTERN MEDICINE contained three articles, one by Dr. John H. Graves, a second by Dr. John C. Ruddock, and a third by Dr. Rexwald Brown, which should be of more than ordinary interest and value. All three discussed medico-economic problems.

* * *

Report of Dr. Graves on "Health Insurance."

—The first, a paper by Dr. John H. Graves of San Francisco, presented the results of a survey on the so-called health insurance problem. The facts presented by Dr. Graves were gathered after much effort, from many sources, and are worthy of serious thought. Dr. Graves, as chairman of the standing committee on economics, took up his study at the request of the Council of the California Medical Association. The Council during the last year or so has been giving considerable time to a discussion of ways and means through which the burdens of illness falling on the "white collar brigade" of lay citizens, might be lightened, without at the same time bringing into being a pauperization of that group of citizens or a demoralization of the standards and methods of medical practice.

One of the major objections to practically all health insurance plans is the difficulty encountered in trying to preserve the individualism in

medical practice—that intimate relationship between physician and patient which in the end works to best interests of the patient, and is equally valuable to the physician. It is through mental alertness in medical observation and practice that physicians make themselves increasingly valuable to their lay fellows and to the community. Health insurance plans which furnish "mass" care of lay persons, at small stipends to attending physicians, are bound to make for mediocrity of service, as witness the experiences of some of the European countries. Mediocrity of service means demoralization of medical standards. That is why all plans trenching on the domain of health insurance must be so carefully studied.

* * *

Report of Doctor Ruddock on "California Clinics."

—A second paper of interest was the survey which on instructions from the Council was made by the standing committee on hospitals and clinics. This survey on the "California Clinic Problem" is the work of Dr. John C. Ruddock of Los Angeles and contains many facts worthy of the attention of members of the California Medical Association. If in places the information given in his report seems incomplete, such absence is due largely to the difficulties encountered in obtaining the information from the officials of certain clinics. This "clinic" situation is one that merits attention from many angles. It must be evident to all, that the medical profession, whose members give the professional services which make possible the existence of public and charitable clinics, has not only a very proper right, but an obligation to have definite information concerning the public and other hospitals and clinics within the state, so that abuses which, under one guise or another, may be creeping into such institutions can be rectified.

* * *

Paper by Doctor Brown on "The Business of Medicine."

—The third paper to which attention is called is that of Dr. Rexwald Brown of Santa Barbara, who discussed a more general, though none the less important, topic, "The Business of Medicine." It is most desirable that members of the medical profession should understand the problems outlined by Doctor Brown and that they should strive to govern their actions accordingly. In the past there has been too little discussion of such matters in the meetings of our medical societies. Unless the medical profession awakens to the nature of the conditions which exist about it, and works for a betterment of deficiencies where such exist, there is danger that the future of medical practice may be seriously handicapped by unwise legislation or other procedures instituted largely by laymen.

* * *

County Societies Should Discuss These Medico-Economic Problems.—Officers of county medi-

cal societies are again urged to give these economic problems a place on meeting programs. Members who are interested should feel free to offer their services in the presentation of such reports or discussions. These medico-economic problems have an intimate relationship to the professional interests of every one of us. If we study and discuss them it will be possible for us to arrive at certain premises and joint conclusions and thus pave the way for rational action. If only a few members do the work of investigation and study, it will be found that when plans for action are presented, that no harmony of effort will be in evidence, because too many members will be pulling backward instead of forward. The time necessary to read the three articles referred to is not very great. Every reader of CALIFORNIA AND WESTERN MEDICINE is urged to take that time out of regard for his personal interests and also because of those of the profession at large.

A PROPOSED CHIROPRACTIC INITIATIVE

A Proposed Chiropractic Initiative Granting More Powers.—For some time past a proposed initiative has been circulated by certain groups of California chiropractors. Whether or not this initiative will receive a sufficient number of signatures to place it on the ballot is not yet known. It is here mentioned because it brings before us a picture of what usually happens when a commonwealth sees fit to recognize cults or sectarian schools of healing art practice.

The advent of the chiropractors into California is all a quite recent event. Their compulsory standards of preliminary education in the past were, and are still, quite far removed from the basic high school education and two years or more of liberal arts work which is demanded by regular or non-sectarian medical schools. Their compulsory professional curriculum and training has been, and is still, far removed from the professional training requirements of non-sectarian medicine. Nevertheless the state of California saw fit about eight years ago, through legislative and initiative action, to legally recognize this group of cultist practitioners, the state presumably being satisfied with the lower standards of preliminary education and of professional training (through acceptance of the specious plea that only a limited number of diseases would be treated, and these by non-medical and non-surgical methods).

Such initial recognition and licensure by a commonwealth is all that in the beginning is ever asked for by a cult seeking legal recognition. The leaders of such cultist groups know that once such initial legal recognition is granted, other legal privileges are almost certain to follow.

* * *

What Are the Educational Standards of Chiropractors.—The Los Angeles Herald of June 11

printed an article on "Chiropractors Split on Law Revision." An excerpt from this article is worthy of perusal by all who believe that the state should protect the public health by refusing legal recognition to practitioners of the healing art, unless such applicants have given adequate evidence of suitable preliminary education and of professional training.

The excerpt sheds some light on all this and is as follows:

"Chiropractors of the state today are divided over a proposed initiative measure governing the profession in California, which is being sponsored by the Progressive Chiropractic Association and a faction of the California Chiropractic Association.

"The California Chiropractic Association officially, however, is vigorously fighting the proposed measure on the ground that it requires study of medical and surgical subjects assertedly foreign to the chiropractic profession and on the ground that it places dictatorial powers in the hands of a state board.

"According to Charles H. Wood, one of the leading members of the Progressive Chiropractic Association, the principal change in the law is that it enables the board to deny graduates of any chiropractic school not providing the curriculum prescribed in the proposed act, the right to practice in California.

"Under the provisions of the proposed law, the board would have power to refuse examination to graduates of schools not having the curriculum prescribed in the act," Dr. Wood said. "Under the present law, the board has no power to investigate the schools whose graduates apply for a certificate to practice."

"As a matter of fact, the board at present is enjoined by the courts from doing so, and must accept the certification of the schools as to the study of the graduates without any determination as to whether the school is a fake or not."

* * *

Other Provisions of the Proposed Initiative.—As regards the proposed initiative, we have been told there are provisions therein permitting chiropractors to do "minor surgery" (no differentiation being made as to what "minor surgery" covers); and that it provides that chiropractors should be eligible to places on the attending and resident staffs of public state, county and city hospitals; and that death certificates, industrial accident and similar reports signed by chiropractors should have full legal recognition.

As previously stated, it is not known whether a sufficient number of signatures will be secured (some ninety thousand or more are needed) to place this proposed initiative on the ballot in the coming state election. If it does find a place on the ballot, it is evident that the matter should receive the attention of all citizens who believe that California should uphold public health standards by denying special healing art privileges to those applicants whose preliminary education and professional training, according to the best modern day experience, are inadequate.

SUMMER DAYS ARE HERE AGAIN—THE VALUE OF A VACATION OUTING MEETING

A Respite from: Medical Meetings Without End.—Once again the summer or vacation season is at hand. With it comes a temporary respite for physicians from the grind of trying to attend society and hospital staff meetings and what not. To be relieved nowadays of the responsibility of being present at the many evening meetings a physician is supposed or is called upon to attend, in itself is almost sufficient to produce the mental quietude which is supposed to be associated with vacation relaxation.

* * *

Why an Outing Meeting Is Advocated.—With this prelude it may seem inconsistent to advocate any kind of additional meeting of medical men at this season of the year.

And yet that is what is here proposed, and the county medical societies which make up the California, Nevada and Utah Medical Associations are urged to take a hand in an outing or good fellowship meeting on some Saturday afternoon or Sunday of the present summer season.

Medical men need to know one another better than they do, and to rub elbows with one another more often. It gives a shock when we look around at the faces in a meeting of one of our larger medical societies or hospitals, to note how many faces we do not know or only faintly recognize. This non-acquaintance or aloofness, arising very properly out of certain responsibilities and dignity in our calling and also because of the individualism associated with successful practice, is pardonable when one appreciates that it originates from no narrow or petty motives. It is not to our credit, however, if we fail to make an effort to break down this undesirable restraint. Physicians need to know one another in somewhat direct and intimate fashion and contact. As successful physicians, they consciously or unconsciously know their patients and sense and use their knowledge of their patients' mannerisms and outlooks as aids in their work. Similar knowledge of one's colleagues would promote better understanding and appreciation of one's fellow physicians.

The reports of meetings which are sent in from month to month to CALIFORNIA AND WESTERN MEDICINE by the secretaries of many of our county medical societies indicate that this need of good personal fellowship and understanding is being fostered by many of the county units. In a goodly number of the smaller county organizations it seems to be quite the fashion for the members to dine together and afterward to have a meeting of the society, or to have an informal supper follow the meeting. That is excellent. It is hoped that more of the county societies will try out such a plan.

It is to be regretted, however, that in the larger centers of population—precisely the environments in which physicians, by and large, personally know least of one another, and where the fellowship of personal contact is needed most of all—that these get-together meetings with suppers are only occasionally held.

How the Merritt Hospital of Oakland and the California Hospital of Los Angeles Hold Outings.—For the larger societies—and for the smaller units also—the plan of holding an annual outing after the fashion of some of our California hospital staffs is advocated. For example, the attending staffs of the Merritt Hospital at Oakland and the California Hospital at Los Angeles annually hold such outings. The editor has attended outing meetings of each of these staffs and can bear witness to the enjoyable times and splendid fellowship everywhere in evidence at their gatherings. The programs are of the most informal nature, the effort being made to provide an adequate number of games in a suitable place out under the trees, so that all present may forget, for the moment, that they are mature and dignified physicians, to be what in the last analysis we all are, or should be—just grown-up boys. The outing announcements of the two hospitals referred to are usually most original and are an index of the wholesome spirit in which the staff members join together to spend a half day or more with one another.

For the older men who so desire, cards, target shooting, quoits and similar games. For the younger staff members, races, such as three-legged, spoon, potato, can be indulged in. The younger members can have a baseball game with the older boys. If a barbecue dinner can be arranged, it can be enlivened with songs by professional or other talent, and if desired a certain number of brief after-dinner talks, humorous and otherwise, can be put on.

* * *

An Active Committee Can Sponsor a Successful Meeting.—A small committee of members who believe in such an outing and who have the enthusiasm to work out the details to put it across, is all that is necessary to create a successful gathering, provided, of course, that by word of mouth or through printed circular the other members are infected with the spirit of coöperation.

No excuse is made for presenting this seemingly humble and non-scientific matter in these columns. The medical profession needs a bit more of the human element in its organization work. Its members, who are called upon day in and day out to meet, and to often carry the serious health and life problems of their patients, themselves need a bit of the relaxation which physicians are so prone to advise for hard-working and over-tensioned patients. Let us ourselves take some of this medicine which we so often prescribe for our lay fellows, especially when it is of so sensible a nature and really so much needed.

The year 1930 will be a good year in which to try out such an outing. Members of county societies who have viewpoints such as are here outlined should feel free to discuss the subject with their

society officers, so that the plan may be given a trial in their respective communities. An outing is such an easy thing to accomplish if gone about in the right way, and can mean so much to medical organization and to all concerned. It is not necessary to have a one-hundred-per-cent attendance. Such an outing can be a great success even with only a limited number of members. Those who attend will profit therefrom and make possible a larger turnout in succeeding years.

To repeat, why not try out this vacation outing meeting plan in this summer of 1930?

THE ADVERTISING PATRONS OF CALIFORNIA AND WESTERN MEDICINE— WHY THEY DESERVE YOUR SUPPORT

Income to California Medical Association from Advertising Patrons of CALIFORNIA AND WESTERN MEDICINE.—Those members of the California Medical Association who took the time to read the report of the editors which was printed in the June issue of CALIFORNIA AND WESTERN MEDICINE may have noted that the cost of publication of the official journal was largely covered by the income received from advertisements. The fact that CALIFORNIA AND WESTERN MEDICINE has such a large and excellent group of advertising patrons—a considerable number of whom have had their announcements in your journal for many years—must be construed as evidence that CALIFORNIA AND WESTERN MEDICINE is truly a good advertising medium for firms who desire to bring their products to the attention of members of the medical profession. It also may be assumed therefrom that the well-known firms which have maintained advertisements for years in CALIFORNIA AND WESTERN MEDICINE must have done so because of reciprocal patronage by members of the California Medical Association.

* * *

Why an Appeal to Coöperate With Advertising Patrons of CALIFORNIA AND WESTERN MEDICINE Is Made.—Attention is called to the past creditable record of your official journal in these matters, in order to emphasize the desirability and necessity of increased coöperation and reciprocity with the advertising patrons of CALIFORNIA AND WESTERN MEDICINE. An increase in advertising revenues would make possible a better and enlarged journal and would permit, also, more generous allocation of funds for the other numerous activities to which the California Medical Association is committed in its efforts for efficient medical organization.

It is the hope of the officers of the California Medical Association that members of the California, Nevada and Utah Medical Associations will cultivate the habit of routinely inspecting the advertising pages of CALIFORNIA AND WESTERN

MEDICINE, and wherever possible of giving preference to firms which through their advertising patronage help support the official journal of these associations.

* * *

More Advertising Patrons Needed from Southern California.—For many years most of the advertisements have come from firms having their headquarters at San Francisco. This may have come about because the journal has always been printed at San Francisco and because the advertising representative has likewise had his base headquarters in that city. With the increasing population of Southern California and the increasing number of physicians there should be a larger representation of firms from that section in the advertising pages.

Members of the Association who deal with firms who could become possible advertising patrons are requested to send in the names of such houses to the central office of the Association at San Francisco. Such information will be gladly received by the officers and an effort made to reach such prospective advertisers.

* * *

Mention CALIFORNIA AND WESTERN MEDICINE Whenever Possible.—On this same subject, members of the California Medical Association are requested to invariably mention CALIFORNIA AND WESTERN MEDICINE when they purchase articles from firms who carry announcements in its pages. Firms are always anxious and glad to have this information because it gives a check to show that money so spent for advertising is well spent.

Reciprocity is a fundamental requirement in all successful businesses. The California Medical Association has as one of its business and professional activities the publication of an official journal. The needs of that journal should and will continue to grow from year to year. To meet those needs adequate budgets will be necessary. It is possible to obtain the funds for much of such budgets by making the official journal a recognized medium of high advertising value. If the members of the state medical associations of California, Nevada and Utah will recognize the importance of all this, and back up such recognition by coöperation as above indicated, a real service will have been done by them for organized medicine in these three states.

An alphabetical index of all advertisers has a standing place on advertising page 8 of every issue. Get the habit of glancing over it before you buy hospital, medical or surgical goods or needs, or before you send patients to special hospitals, sanatoria or sanitariums. Suggestions for betterment or extension of advertising as well as of the text pages are always gladly received by the editors and officers of the Association. Your coöperation is requested and needed.

MEDICINE TODAY

Current comment on medical progress, discussion of selected topics from recent books or periodic literature, by contributing members. Every member of the California Medical Association is invited to submit discussion suitable for publication in this department. No discussion should be over five hundred words in length.

Medicine

Pellagra.—The cause of pellagra is one of the subjects of medicine about which there is considerable controversy, but in the light of the more recent research the nutritional theory seems to be the most probable.

It is believed that inasmuch as the disease is undoubtedly on the increase in California, a short discussion of it will not be untimely.

During the ten years, 1920 to 1929 inclusive, 449 cases of the disease have been reported to the California State Department of Health.

While this number of cases is not very large as compared with other diseases, the fact that it was more than four and one-half times more prevalent in 1929 than in 1920, should certainly stimulate our interest.

The following is a list of cases as reported year by year:

1920.....	16
1921.....	21
1922.....	32
1923.....	42
1924.....	38
1925.....	63
1926.....	58
1927.....	45
1928.....	61
1929.....	73

This list is probably, to a large extent, made up of cases that have occurred in institutions and public health agencies throughout the state. There unquestionably have been many more that were unrecognized or unreported in private practice.

Increased population alone does not account for the increase, for the population in 1920 was 3,426,861 and was approximately only 4,556,000 in 1928. In 1920 there was reported one case for approximately every 215,000 inhabitants, while in 1929 the ratio was about one reported for every 62,500.

Evidently there is something in the present economical, nutritional or hygienic condition of our population that is more marked than it was in 1920.

In the September 2, 1927, issue of the United States Public Health Report, Goldberger reiterated his nutritional theory and gave a short description of the disease.

He stated that the disease was in no way communicable; that no germ had been found and that experiments in which inoculation with blood, saliva and other body discharges from pellagrins, failed to transmit the disease. On the other hand, he found that restricting the diet in certain proteid foods in healthy individuals did produce

the chain of symptoms which we know as pellagra.

He believed that these symptoms were caused by the deficiency of some vitamin or vitamins which he designated as P-P (pellagra-preventing) vitamin. In his experiments he found that such foods as beans, peas, lean meat, milk and powdered yeast were rich in P-P, particularly the latter. Fruits, potatoes, turnips, string-beans, tomatoes, cabbage and spinach also contain P-P but in smaller amounts.

During the past four or five years, in our work at the Alameda County Health Center, we have been struck by the great increase in the number of pellagrins who are alcoholics. The histories of these individuals show they had been well until they went upon a prolonged spree and that the first symptoms of the disease had appeared immediately thereafter. How much of this condition can be attributed to alcohol and how much to the lack of proper diet during the spree is conjectural.

For prevention and treatment of the disease, Goldberger advocated milk (about two pints daily); lean meat (beef, mutton, pork, fish, fowl), one-half pound per day; and powdered yeast, one ounce per day. This latter, when killed, is richer in P-P vitamin than any other substance known. The dry yeast should be powdered and then boiled in water for one minute before using.

During an actual or impending attack one should begin with foods rich in P-P and at the same time within the capacity of digestion. It is best to begin with powdered yeast (prepared as noted above); milk (sweet or buttermilk); lean meat (fresh meat juice, scraped beef); egg yolk; tomato juice (fresh or canned); and bean or pea puree. As improvement occurs increasing amounts of solid foods may be added.

F. H. STIBBENS, Oakland.

Eye

Foreign Bodies in the Cornea.—All cases of foreign body in the cornea are potentially dangerous, and should be treated by an oculist if possible. The first step in treatment is to find the foreign body, and for this purpose, perfect light, preferably a Hammer lamp, and magnification are essential. A Berger loupe is usually adequate, but in some cases a slit lamp and corneal microscope may be necessary. The foregoing would seem obvious, but every oculist has seen cases in which very strenuous efforts had been

made to remove a spot of pigment from the iris, under the impression that it was a speck in the cornea.

Anesthesia must be complete, since it is impossible to hold one's eye still, when it is painfully traumatized by a spud. My own preference is a drop or two of cocaine solution five per cent, followed by holocain solution one per cent, at intervals of two minutes. Cocaine alone tends to dry the cornea, increasing the danger of ulceration, and holocain is very irritating to an inflamed eye. Some antiseptic, such as mercurochrome, which is always available, should be instilled into the conjunctival sac, and the eye irrigated in a moment or two.

Again light and magnification are essential. The patient should be directed to look at something with the uninjured eye, so that neither eye will move. An attempt should be made at removal with a bit of moist cotton, on a toothpick applicator. Failing in this a spud should be used, the pattern to be decided by individual preference. The lids of the injured eye should be held by pressure of the thumb and finger of the left hand. The spud is held by the right hand, and the little finger rested on the patient's cheek or nose to secure steadiness. The point of the spud should be inserted beneath the edge of the foreign body, to lift it out. Every bit of it should be removed, and in the frequent cases where the surrounding tissue is stained or burned, this, too, should be taken out with a corneal bur.

After-treatment is very important. A drop of antiseptic should be instilled, and in all but the mildest cases, the eye should be bandaged for at least twenty-four hours, or until it is quiet. This protects the damaged cornea, and minimizes the danger of ulcer. Patients appreciate holocain one per cent either solution or ointment, to keep the eye comfortable after the anesthetic wears off.

SAMUEL A. DURR, San Diego.

Dermatology

Thallium Acetate.—Several years ago thallium was used for its antihydrotic action in combating night sweats of tuberculosis, and in many cases so treated loss of hair was noted. In 1900 Buschke, in experiments upon mice, rats, guinea pigs, apes, and rabbits, obtained the same results. By giving the animals two homeopathic tablets of thallium acetate dissolved in water and mixed with their food, he observed that the hair fell out in a few weeks, first in patches, later totally, and that animals could be kept naked by suitable feeding without there occurring any severe toxic disturbances.

According to him, the vibrissae, the sensitive hairs of the nose and face, were never affected with alopecia by thallium, because these hairs differ from the other hairs on the body, not only anatomically, but also in function, and are connected with the central nervous system directly;

while the other hairs are under the influence of the sympathetic system. This can be demonstrated by stimulation of these nerves or by their section.

If these entirely naked animals were fed larger doses of the drug, growth stopped, or remained far behind others, sexual impulse ceased or failed to develop, psychic disturbances occurred, and altogether they presented a cretinoid appearance.

From these and other observations, he concluded that its action was due to some injury to the endocrine apparatus as well as to the sympathetic nervous system with which it is so closely bound up. Owing to this epilating action which the drug exerts, it has been used rather extensively during the past three years in the treatment of ringworm and favus infection of the scalp in children. In many instances it has supplanted the use of x-ray in producing the complete temporary alopecia, so necessary to the rapid cure of these diseases. Not that the epilation produced by x-ray is not just as efficacious or perhaps more so than that produced by thallium, but its use requires expensive apparatus and special training, neither of which are possessed by other than the dermatologist as a rule. Thallium, on the other hand, is inexpensive, a large number of children can be treated in a short time (a distinct advantage in orphanages, etc.), and it can be used by the general practitioner.

Before using it the clinical diagnosis should be confirmed by a microscopical examination of the infected hair, and the urine examined to be sure of the absence of albumin (thallium is excreted by the kidneys, and they are especially liable to injury by the toxic elements in the drug). The child is then carefully weighed without clothing. For each kilogram of body weight, eight milligrams of thallium acetate dissolved in peppermint water are given by mouth at one dose (it is tasteless). The hair begins to fall in about eight days and, when successful, alopecia is complete by the twenty-first day. The epilation is spontaneous in about 50 per cent of the cases, and in the others it must be completed by extracting the loose hairs by means of adhesive strips, which is entirely painless.

The hair begins to grow again in about four weeks and in the interval the scalp should be painted with tincture of iodine daily and a 10 per cent sulphur ointment also applied daily. In three months regeneration is nearly complete.

Toxic symptoms, such as pains in lower limbs (peripheral neuritis), some loss of appetite and an occasional headache appear in a few cases. These are promptly relieved by rest in bed.

Thallium should not be used for this purpose in children approaching puberty because of its toxicity in such large doses.

ERNEST K. STRATTON, San Francisco.

Urology

The Innervation of the Kidney.—The innervation of the kidney has been a question about which considerable difference of opinion has always existed and still does. The fact that a kidney can be successfully transplanted to another part of the body of the same animal and function normally in its new position seems to disprove the necessity of any central innervation. Studies of such kidneys, however, have not been sufficiently extensive for any real conclusion. Condorelli (*Arch. di patol. e clin. med.*, vi, 281-304, 1927) has conducted some rather interesting experiments, with conclusions that are the opposite of the above experimental indications. Structurally, fibers of the vagi and splanchnics are so intimately associated at the level of the celiac axis as to be inseparable by dissection. In order to estimate the relative influence of these two sets of nerves upon renal activity, he used as an index of function the localization of carmin in different parts of the kidney after intravenous injection. Suzuki's formula of a solution of carmin was injected intravenously into rabbits and white mice and the animals killed thirty minutes after the injection, and their kidneys studied macroscopically and microscopically. To test the influence of the vagus, it was cut, electrically stimulated, injured by atropin or activated with pilocarpin. If the vagus was cut on one side, there was the same effect in both kidneys; the tubuli recti and the collecting tubules on both sides always were found to be free of carmin, whereas in control animals usually these portions of the secreting unit contained cylindrical masses of carmin. Furthermore, the characteristic intra- and extracellular granules normally present in the convoluted tubules were absent after vagi section. The glomeruli were always free of carmin granules in control animals and also after vagus section. Upon electrical stimulation of the left vagus in the neck, the kidney of the same side had convoluted tubules and Henle's loops filled with carmin, and the cells lining these portions were also filled with finely stained granules. The collecting ducts contained massive cylinders of the dye stuff but the glomeruli showed no change, being empty. In the kidney of the opposite side the same conditions were found, after electrical stimulation probably not so marked. Irritating the nerve with 0.05 milligram of atropin sulphate in a mouse of 30 grams weight produced a marked dye accumulation, and ten times the amount acted in the same way as a strong vagus stimulation. Pilocarpin 0.5 milligram in a mouse increased the rate of carmin excretion noticeably. As a test of the influence of the splanchnics, the left splanchnic major intrathoracically was cut through and the carmin was injected twenty-four hours post-operatively. The kidneys acted in almost the same way as after vagus stimulation. When the sympathetic of the neck on one side was stimulated with a faradic current, the excretion of carmin in both kidneys was markedly diminished. It was also found that the injection of 0.02 to 0.01 milli-

gram of adrenalin very markedly diminished the carmin excretion in mice. Complete denervation of the kidney had a very marked inhibitory effect on the excretion in this kidney as well as a noticeable diminution of the other kidney, but it is possible that the cause of this is to be found in the trauma of operation. The experimenter concluded that the vagus has an activating influence upon the two kidneys which is particularly marked in the convoluted tubules, whereas the sympathetic acts to diminish secretion, especially inhibiting the epithelium of the tubules.

FRANK HINMAN, San Francisco.

Automobile May Be Safely Driven by the Physically Disabled.—On the Other Hand, a "Hair Trigger" Mentality May Be a Handicap For Safe and Sane Driving.—An interesting sidelight on contributing factors to public safety is announced through the psychological tests for automobile operators conducted at Ohio State University by Dr. Knight Dunlap of the department of psychology at Johns Hopkins University.

For these experiments revealed that a greater asset than intelligence in a driver is self-control. Excellent motor drivers may be made from men who cannot pass a simple intelligence test. Properly equipped cars may be handled by the disabled, with either a leg or an arm missing. On the other hand, a "hair trigger" mentality may be a handicap for safe and sane driving. Even the deaf can make good drivers. But a deaf pedestrian is in a bad way—very bad.

Common-sense training in the manipulation of steering wheel, brake, and clutch, and a knowledge of and ability for gear shifting are demanded, according to Dunlap.

The man who can see but who won't watch is more of a menace than a man with impaired eyesight who keeps on the alert.

According to Doctor Dunlap, a color-blind person can become a safe driver. Doctor Dunlap declares all persons are color-blind except when they look squarely at an object. Since an autoist usually observes a traffic signal out of the corner of his eye, because he has to watch pedestrians and other motorists at the same time, signals are designed on the assumption that all motorists are color-blind. Fortunately, there are two colors which a color-blind person can distinguish as well as a man with normal vision—orange red and blue-green. Signal engineers are adopting these colors.

Ingenious apparatus disclosed these and other facts about motorists in Doctor Dunlap's tests. In one test of eye, hand, and foot coördination, subjects sat at the wheel of a dummy automobile. This had the steering mechanism, brake, and clutch of a light car, and an electric seat that registered the "driver's movements. Six feet in front, an illuminated chart represented a highway.

Along this imaginary highway the subject drove his car. One pointer on the chart showed the course of the test car. Another pointer represented an imaginary vehicle coming toward it.

A "noise barrage" was the means of testing a driver's lack of "emotional stability"—in other words, his tendency to fly off the handle or become confused by strange sights and noises. The subject sat in a padded chair, a pair of electrified handles in his hands. These carried a current far too mild to be felt, for the object was to detect the extremely delicate changes in the body itself. Suddenly bells clanged. Lights flashed crazily. Buzzers whirled. A gun cracked, so close that the subject could smell the burning powder.—Meanwhile a delicate galvanometer, an electric meter in the next room, measured the subject's ability to keep calm. Hardly anybody but truck drivers survived this test.—*Illinois Medical Journal*, June 1930.

STATE MEDICAL ASSOCIATIONS

CALIFORNIA MEDICAL ASSOCIATION*

LYELL C. KINNEY President
JUNIUS B. HARRIS President-Elect
EMMA W. POPE Secretary

COMPONENT MEDICAL SOCIETIES

ALAMEDA COUNTY

The Alameda County Medical Association was unusually fortunate in having as a guest speaker at a special meeting held on Saturday evening, July 5, the well-known orthopedist, Surgeon-in-Chief of the Accident Hospital of Vienna, Dr. Lorenz Böhler.

Dr. Böhler talked at great length on the treatment of fractures of various types, illustrating his talk by lantern slides and moving pictures. He showed the common, as well as the unusual, types of fractures of practically all of the bones of the skeleton, together with his methods of treatment, which were unique in that he uses twenty cubic centimeters of a two per cent novocain solution to completely anaesthetize the part before adjustment is made. He also illustrated in detail the use of the unpadded plaster cast, of which he is the originator. He illustrated a novel method of keeping the salient points of the history and the nature of the injuries before the physician at all times by recording them on the plaster cast and roughly sketching an illustration of the fracture.

This was Dr. Böhler's only lecture in the Bay Region, and those who heard him agree that he is a master in his line.

GERTRUDE MOORE, *Secretary*.

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NAPA COUNTY

The regular monthly meeting of the Napa County Medical Society was held Wednesday, June 4, at the Napa Valley Country Club. A splendid banquet preceded the business meeting, which was opened by Dr. G. I. Dawson, president. It was moved and carried that Napa County Medical Society approve the appointment of Doctor Abbot, of Alameda County, as a member of the Board of Medical Examiners.

The following members from Sacramento favored us with a most interesting program.

Dr. F. F. Gundrum, "Irregularities of the Heart."

Dr. T. R. Haig, "Low Back Injuries."

Dr. Harry M. Kanner, "Low Flap Caesarean," illustrated with lantern slides.

Dr. J. B. Harris, "Impending Medical Legislation."

Members present: H. V. Baker, W. L. Blodgett, M. M. Booth, I. E. Charlesworth, H. R. Coleman, G. I. Dawson, C. A. Gregory, C. A. Johnson, A. K. McGrath, D. H. Murray, C. E. Nelson, R. S. Northrop, J. Robertson, L. Welti.

Visitors: J. W. Green, Vallejo; J. E. Hughes, Vallejo; M. K. Lewis, Petaluma; A. McLeish, Veterans Home; S. Z. Peoples, Petaluma; H. S. Rogers, Petaluma; J. W. Sewel, Petaluma; D. B. Williams, Imola.

C. A. JOHNSON, *Secretary*.

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SANTA BARBARA COUNTY

The regular meeting of the Santa Barbara County Medical Society was held, according to custom of many years, in Santa Maria, July 14. A fine barbecue

*For a complete list of general officers, of standing committees, of section officers, and of executive officers of the component county societies, see index reference on the front cover, under Miscellaneous.

dinner was served at the Santa Maria Club to sixteen members, five visitors from Los Angeles, and eleven from San Luis Obispo County.

There being nothing of importance, routine business was dispensed with and Dr. O. C. Jones, vice-president, introduced the speaker of the evening, Dr. Howard L. Updegraff, of Los Angeles. He gave a very full and interesting talk on "Methods of Reconstructive Surgery," profusely illustrated by colored slides and moving pictures.

The great recent advance in removal of deformities, new technique in skin grafts for forming new noses and restoration following traumatism, cancer, ulcerations and burns on the face and body.

Models, moulds and methods were graphically shown.

Discussion by Dr. J. D. Lewis.

PHILIP C. MEANS, *Secretary, pro-tem*.

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SANTA CLARA COUNTY

The annual meeting of the Santa Clara County Medical Society was held in the Society Rooms of the Medico-Dental Building, June 18. The retiring president, Dr. E. Paul Cook, called attention to the fact that for the previous year the average attendance at the meetings was sixty-four or 43 per cent of the membership.

During the past year, under the chairmanship of Dr. Earl O. G. Schmitt, a county medical library has been established in the Society Room of the Medico-Dental Building, where over forty of the leading medical magazines will be regularly received.

The following officers were elected for the ensuing year:

President, Dr. C. M. Burchfield; first vice-president, Dr. George L. Barry; second vice-president, Dr. Robert A. Powers; third vice-president, Dr. R. H. Prien; secretary, Dr. Dudley Fagerstrom; assistant secretary, Dr. Lucas W. Empey; treasurer, Dr. Harry J. Hoag; councilors-at-large, Dr. E. P. Cook, Dr. A. A. Shufelt, and Dr. Earl O. G. Schmitt.

JOHN HUNT SHEPARD, M. D., *Assistant Secretary*.

CHANGES IN MEMBERSHIP

New Members

Fresno County—Carl H. Shuck.

Humboldt County—Lloyd G. Tyler.

Kern County—Henry G. Crease.

Riverside County—Lewis P. Bolander.

San Diego County—Axentie T. Babienco, Otto August Houzvicka, Ralph Kaysen.

Siskiyou County—Louis Joseph Lista.

Resignations

John R. Williams, from Santa Clara County.

Martin McAulay, from Monterey County.

Deaths

Gwaltney, John Sanford. Died at San Pedro, July 2, 1930, age 71 years. Graduate of Keokuk Medical College, Iowa, 1891. Licensed in California, 1898. Doctor Gwaltney was a member of the Los Angeles County Medical Association, the California Medical Association and the American Medical Association.

Schmitz, John. Died at Los Angeles, May 31, 1930, age 75 years. Graduate of Rush Medical College, Chicago, 1882. Licensed in California, 1888. Doctor Schmitz was a member of the Los Angeles County

Medical Association, the California Medical Association and a Fellow of the American Medical Association.

Watters, Peter Kemp. Died at Watsonville, June 24, 1930, age 76 years. Graduate of State University of Iowa College of Medicine, Iowa City, 1879. Licensed in California, 1893. Doctor Watters was retired, a former member of the Santa Cruz County Medical Society, the California Medical Association and the American Medical Association.

Weber, Philip Henry. Died at Yosemite, July 7, 1930, age 49 years. Graduate of Cooper Medical College, San Francisco, 1905. Licensed in California, 1905. Doctor Weber was a member of the Alameda County Medical Society, the California Medical Association and a Fellow of the American Medical Association.

THE WOMAN'S AUXILIARY OF THE CALIFORNIA MEDICAL ASSOCIATION*

Officers Elected, Woman's Auxiliary of the American Medical Association.—The newly elected officers of the Woman's Auxiliary of the American Medical Association for the coming year are:

President, Mrs. Newton Hunsberger, Norristown, Pennsylvania.

President-elect, Mrs. A. B. McGlothlan, St. Joseph, Missouri.

First Vice-President, Mrs. Southgate Leigh, Norfolk, Virginia.

Second Vice-President, Mrs. James Blake, Hopkins, Minnesota.

Third Vice-President, Mrs. C. W. Garrison, Little Rock, Arkansas.

Fourth Vice-President, Mrs. James F. Percy, Los Angeles.

Treasurer, Mrs. F. L. Adair, Chicago.

Recording secretary, Mrs. A. T. McCormack, Louisville, Kentucky.

Corresponding secretary, Mrs. H. C. Podall, Norristown, Pennsylvania.

Directors, Mrs. Basil L. Connelly, Detroit; Mrs. Ephraim R. Mulford, Burlington, New Jersey; Mrs. Frank W. Cregor, Indianapolis.

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A letter from the secretary-treasurer of the Woman's Auxiliary of the California Medical Association to the women of the Auxiliary:

Have you heard the good news? Our state president, Mrs. James F. Percy, of Los Angeles, has become our national fourth vice-president. I am sure you all wish to congratulate Mrs. Percy for this honor she brings back to us all.

Since the Del Monte meeting, I have been getting acquainted with the office of secretary-treasurer and feel most enthusiastic about the work that was accomplished by Mrs. Rogers and Mrs. Cushman last year and the work that can be accomplished this year. Of course, in order to make this organization 100 per cent we must all be interested and endeavor to interest every other woman eligible for membership. This we must do by making our meetings interesting and purposeful.

No organization can live without a purpose. The auxiliaries have so many vital things they can be doing that it is difficult to choose what to do first. Mrs. George H. Hoxie, the retiring president of the Woman's Auxiliary of the American Medical Association, has said, "Educate yourself in the disease prevention and health promotion and then get a strategic place in some other women's organization and carry the educational work with you." With this in mind, the National Program Committee has prepared a series of study programs, which I am mailing to all

*As county auxiliaries to the Woman's Auxiliary of the California Medical Association are formed, the names of officers should be forwarded to the state secretary-treasurer, Mrs. Dexter R. Ball, 2419 Bonnie Brae Street, Santa Ana, and to the California Medical Association office, Room 2004, 450 Sutter Street, San Francisco. Brief reports of county auxiliary meetings will be welcomed for publication in this column.

of the county units, and hope this will give you some definite work to do in "educating yourselves." Dr. William Duffield suggested, in his talk at Del Monte, a list of books to read and discuss. These will be found at the end of Mrs. Cushman's minutes of the Del Monte meetings in the June issue of CALIFORNIA AND WESTERN MEDICINE.

The object of the officers this year is to make this auxiliary permanent and 100 per cent in every way. The state dues for 1930 to 1931 were lowered as one step in this direction. The programs for study should be another step and the book reviews another.

May I give you some facts about the California Auxiliary? There are forty County Medical Associations in the state, with a total membership of 4,854 physicians. Doctor Duffield estimates that there are three women eligible to the auxiliary for each of these physicians. That would be 14,562 women in the state that *could* be members. What a potential force this great number would be if their efforts were intelligently and harmoniously coordinated!

Eleven county auxiliaries were formed in California since May, 1929. This is 27 per cent of the counties. The total paid-up membership of the units is 675. This is only four per cent of the eligible women in the state. These are distributed in the following counties:

Alameda County Auxiliary.....	58 members
Contra Costa County Auxiliary.....	17 members
Kern County Auxiliary.....	16 members
Los Angeles County Auxiliary.....	436 members
Monterey County Auxiliary.....	12 members
Napa County Auxiliary.....	15 members
Orange County Auxiliary.....	40 members
San Bernardino County Auxiliary.....	11 members
San Diego County Auxiliary.....	44 members
Santa Barbara County Auxiliary.....	7 members
Sonoma County Auxiliary.....	19 members

No organization can exist without members and new life. But with such a start and with the study programs, the book reviews, the lower dues and educational talks, enough interest should be aroused in every county to make this a very strong and enthusiastic association.

MRS. DEXTER R. BALL, *Secretary-Treasurer.*

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WOMAN'S AUXILIARY OF LOS ANGELES COUNTY MEDICAL ASSOCIATION

Mrs. Philip Schuyler Doane, first vice-president, presiding in place of Mrs. J. F. Percy, at the large and enthusiastic meeting of the Woman's Auxiliary, on June 19, in the Friday Morning Club Building. Mrs. Doane paid our absent president, who is attending the meeting of the National Auxiliary in Detroit, a well-earned tribute, referring to the high honor accorded Mrs. Percy at Del Monte in making her president of the State Auxiliary as being an honor to our Los Angeles County Auxiliary as well, since Mrs. Percy still remains with us as our president. Mrs. Doane then presented Mrs. Dexter R. Ball, of Santa Ana, secretary-treasurer of the State Auxiliary, who was a guest of the afternoon.

In introducing Dr. William Duffield as the speaker, Mrs. Doane made a happy reversal of the usually stilted introductory form, paying a graceful compliment to the speaker by introducing the audience to him. Doctor Duffield, she said, was a man who finished whatever he started, who believed whatever he said, who had the courage of his convictions. This estimate was confirmed in the substance of Doctor Duffield's address.

Needless to say, only the highlights of such an address, cryptic with useful suggestions and good advice, can be touched upon here. The speaker dwelt forcefully upon the possibilities of this Woman's Auxiliary organization and made the statement that if it accomplished nothing more than that of promoting acquaintanceship and friendship among the families of physicians, its influence for the betterment of the community and of the medical profession itself, would be tremendous.

Doctor Duffield spoke for only one hour, but in that hour he condensed a wealth of practical suggestions

for the good of the community, the advancement of the medical profession and the exalted position that may be attained by the Woman's Auxiliary by its active participation. And he expressed his belief that such a position would be attained and this accomplishment greatly enhanced by the activities of the present organization which had so recently begun its important functioning.

A happy social hour at the tea tables followed Doctor Duffield's address. The next meeting of the auxiliary will be held during the third week in October—the announcements carrying the exact date being out about October 1.

CORA YOUNG WILLIAMS, *Publicity Chairman.*

UTAH STATE MEDICAL ASSOCIATION

H. P. KIRTLEY, Salt Lake City.....President
WILLIAM L. RICH, Salt Lake City.....President-Elect
M. M. CRITCHLOW, Salt Lake City.....Secretary
J. U. GIESY, 701 Medical Arts Building,
Salt Lake City.....Associate Editor for Utah

OFFICIAL NOTICE—ANNUAL SESSION

The annual meeting of the Utah State Medical Association will be held September 9, 10 and 11, this year.

While the program is not yet definitely outlined the committee has been at work with results. A large number of prominent men have accepted invitations to address the scientific sections, such men as Harlow Brooks, Wirthlin, Ivy, Dean Lewis and Leo Eloesser. Other names, it is expected, will be added. The names cited, however, assure the success of the scientific program of our annual session.

Aside from the scientific element there will be a somewhat elaborate program of entertainment for visiting speakers, members and their wives. The Woman's Auxiliary will cooperate to make this a social success. And then there will be the banquet.

Bill Donohur will probably be the "roast master" for the occasion. If he is, the flow of wit and joviality will be full and constant.

Mark the dates, September 9, 10 and 11, as not open for any other business and come for instruction, pleasure and enjoyment. We want the attendance to be large.

COMPONENT COUNTY SOCIETIES

SALT LAKE COUNTY

The regular meeting of the Salt Lake County Medical Society was held at the St. Mark's Hospital on Monday evening, May 26, 1930.

Meeting was called to order at 8:30 p. m. by President M. M. Nielson. Forty-six members and four visitors were present.

The following clinical program was presented:
"Pemphigus".....E. M. Neher
Discussed by C. J. Pearsall

"Lead Poisoning".....D. L. Barnard
Discussed by J. Z. Brown and F. E. Boucher

"Pathological Specimens".....O. Ogilvie
"Gastro-enterostomy".....Motion picture

The minutes of the meetings of April 28 and May 12 were read and accepted without correction.

The application of J. P. Tuttle was read and turned over to the Board of Censors.

F. M. Poulson was unanimously elected a member of the Society.

President Nielson announced that at the last meeting of the Board of the Radium Corporation \$600 was given the Society for use in defraying some of the expenses of the medical library.

M. M. Nielson appointed a committee, consisting of E. M. Neher, chairman; J. Z. Brown, and C. Shields, to investigate the advisability of the Society forming a credit rating bureau.

Meeting adjourned at 9:45 p. m., after which refreshments were served.

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The regular semi-annual business meeting of the Salt Lake County Medical Society was held at the Newhouse Hotel on Monday evening, June 9.

Meeting was called to order at 8:10 p. m. by President M. M. Nielson. Forty-eight members were present.

A. C. Callister presented a case of "Thoracoplasty."

Committee Reports

A. C. Callister reported the work of the Committee on Public Health and Legislation. E. M. Neher moved that the report be accepted. Seconded and carried.

J. C. Landenberger reported for the Medico-Legal Committee. The report was accepted.

T. C. Gibson moved that the committee be given a vote of thanks for their excellent work in the past six months. Motion seconded and carried.

The reports of the Necrology Committee, J. U. Giesy, chairman, of the Library Committee, W. R. Tyndale, chairman, and of the Committee on Public Lectures, A. L. Huether, chairman, were accepted.

M. M. Nielson reported the action of the Board of the Radium Corporation and handed the treasurer a check for \$600 for use in defraying some of the expenses of the medical library. J. Z. Brown moved that the Society accept the gift and that it extend to the Radium Corporation a vote of thanks. Seconded and carried. J. Z. Brown also suggested that the Society cooperate in every possible way with the Radium Corporation.

The report of the Boy Scouts Committee, J. L. Paul, chairman, was accepted. J. Z. Brown moved that the Society urge the parents of Boy Scouts to consult their family physicians regarding vaccinations, and that the committee notify the local secretary of this action. Seconded and carried.

The Fee Schedule Committee, J. P. Kerby, chairman, presented the new fee schedule for adoption. This report was discussed by Doctors Coray, Phipps, Scott, Viko, Gibson and Beer. W. F. Beer moved that the report be adopted. Seconded and carried.

A. C. Callister, reporting verbally for the Caduceus Committee, stated that the committee had decided to suggest no changes in the handling of the Caduceus tax by the Police Department. The report was accepted.

The report of the Committee on Irregular Practices, D. G. Edmunds, chairman, was accepted after discussion by M. M. Nielson, J. Z. Brown, W. F. Beer and H. S. Scott.

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Fee Table

The following amendment to the By-laws was passed:

"The fee bill adopted at this meeting is intended to represent the average fee under ordinary circumstances, both columns referring to minimum fees, the difference between them indicating common differences, depending upon the responsibility and judgment involved in treating different cases, and the ability of patients to pay. This fee schedule shall not attempt to indicate proper compensation in those cases requiring special skill, extraordinary responsibility, or unusual character of service. The Society recognizes the right of every member to charge what he believes to be a fair and adequate fee for services rendered, or to give the whole or any part of his services in charity; but it will be considered his duty to abide by the fee schedule herein mentioned whenever the circumstances of the patient do not clearly forbid. Any violation of the provisions of said fee schedule solely for the purpose of securing a patient shall be considered ipso facto cause for loss of membership. The usual procedure of this Society in the matter of filing a complaint against a member shall be followed."

* * *

The following resolution was presented by W. F. Beer:

WHEREAS, there are teachers in the Medical Department of the University of Utah who are devoting their whole time to the instruction of medical students, and

WHEREAS, several county medical societies in other states, and the American Medical Association, have an Associate Membership for teachers in medicine who have no M. D. Degree,

THEREFORE BE IT RESOLVED: that the Salt Lake County Medical Society urge the Utah State Medical Association to so change its By-laws that the Salt Lake County Medical Society may form an Associate Membership for the purpose of admitting such teachers.

B. I. Burns moved the adoption of this resolution with the instruction for delegates of this Society to the State Convention to vote for the suggested change in the By-laws of the Utah State Medical Association. Motion seconded and carried.

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J. P. Tuttle was unanimously elected a member of the Society.

The Society then proceeded to the election of delegates to the Utah State Medical Association meeting. The following delegates were elected: E. F. Root, F. M. McHugh, L. J. Paul, E. R. Murphy, B. E. Bonar, M. Schofield, J. A. Phipps, B. I. Burns, and D. G. Edmunds. The following alternates were elected: W. R. Tyndale, M. Nelson, and J. U. Giesy. A. C. Callister moved that three more alternates be elected. Motion seconded and carried. F. F. Hatch, L. W. Ossman, and C. Shields were elected by acclamation.

R. J. Alexander asked that the members of the Society, wishing to serve on the staff of the Salt Lake General Hospital make their applications immediately.

Meeting adjourned at 10:10 p. m.

BARNET E. BONAR, *Secretary*.

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WEBER COUNTY

Weber County Society has suspended meetings for the summer term following the meeting of June 30.

This meeting was one of the high spots in the year's activities, and was opened to all members of the State Association on invitation, the occasion being the presence of Dr. Lorenz Böhler of Vienna, Austria.

At 7:30 on the evening of Monday, June 30, a banquet in honor of Doctor Böhler was held at the Hotel Bigelow, Ogden. Following this the Doctor gave a lecture on his methods on fracture work, which has been recognized as outstanding for years.

The invitation to participate was accepted by numbers of men from the different component societies of the state, and a delightful and instructive evening was spent.

CONRAD H. JENSEN, *Secretary*.

Aspects of Birth Control as It Affects Physicians in Massachusetts.—On May 7, 1930, a meeting was held at the Medical Library by about seventy-five physicians to consider the subject of certain aspects of so-called birth control as it affects physicians in Massachusetts.

Dr. James F. Cooper of New York (formerly of Boston), Medical Director of the American Birth Control League and author of several treatises relating to contraception, addressed the meeting.

He gave a detailed account of conditions leading up to the enactment of laws in the several states and also the federal statute, explaining that the original federal law sponsored by Anthony Comstock was designed to abolish obscene and indecent literature and that no proponent of legislation relating to contraception had in mind a purpose to impose restrictions on physicians in dealing with the advisability of giving information with respect to the prevention of pregnancy.

The wording of the various laws has, however, created doubt as to the possibility of physicians having to meet prosecution based on complaint of some one antagonistic to the practice of giving advice to women who need to be spared the dangers of pregnancy.

Although doctors have been called before the courts because of alleged infraction of the laws relating to this subject none has been convicted; but it was explained that the fear of prevention has led to the conviction that the laws should be clarified so that, although intended to apply only to obscene or indecent literature, there would be no misunderstanding of its intent or misapplication of its purpose. At the present time, it was pointed out, many persons representing physicians and the laity feel that a change in the statutes is desirable.

The most effective organized movement was taken by the National Gynecological Society at a recent meeting in Washington by the appointment of a committee which will work for a modification of the federal statute.

Dr. Cooper enumerated the usual list of diseases which are regarded as justifying contraceptive practice and gave his personal opinion of the relative value of the various methods employed.

The address was a clear exposition of existing conditions and the purpose of those who desire to have the present laws modified. Dr. Cooper offered to supply appropriate literature to anyone who would apply.

—*The New England Journal of Medicine*, May 15, 1930.

Yale's Institute of Human Relations.—The mere announcement that Yale University is establishing an Institute of Human Relations sounds as fantastic and presumptuous as the proposal of H. G. Wells to write a history of the world. And yet Mr. Wells did it and it looks as though the few remaining millions necessary to round out the building and endowment program of the so-called Human Welfare Group will be forthcoming. This group will consist of the Yale Medical School, the Yale School of Nursing, the New Haven General Hospital and Dispensary, and this so-called Institute of Human Relations, the whole representing an investment of some \$30,000,000.

Many agencies, religious, moral, social, governmental, medical, etc., are working along their respective lines in an effort to better human conditions. But there has been a surprising lack of correlation of these various activities. This correlation is what the Institute of Human Relations is going to attempt. The Institute in addition to being closely associated with the medical activities of Yale University will also be affiliated with the divinity and law schools, and the departments of psychology and sociology. Thus all university activities which have to do with man's mental, physical, and social welfare will be brought together to some extent under the one roof of the Institute. Research will be an important part of the Institute's work. Members of the graduate schools of medicine, law, and divinity will also have the benefit of instruction in other matters bearing on human welfare than their own.

There are certain subjects which might well be added or substituted if need be in undergraduate medical instruction of today to advantage. As a result of present-day medical training, it is only too easy for the young physician to see only the physical side of the patient and to forget that his mental attitude, family, and financial worries may play an important part in his complaint. We can see a distinct advantage in undergraduate instruction in psychology and sociology in furnishing the young physician of today with that something so valuable in the handling of patients which the family doctor of yesterday possessed in such large measure.

Such a praiseworthy attempt to evolve some solution for some of the tremendous social problems of today merits the support of serious-minded capitalists. That the Institute of Human Relations has obtained the generous support of such individuals as well as grants from the Rockefeller Foundation, the General Education Board, and the Commonwealth Fund, is evidence of the sense of custodianship alive in at least some of our wealthy citizens. The results of this undertaking, which seems almost in the nature of an experiment, will be awaited with considerable interest by medical men especially.—*Minnesota Medicine*, May, 1930.

MISCELLANY

Items for the News column must be furnished by the twentieth of the preceding month. Under this department are grouped: News; Medical Economics; Correspondence; Department of Public Health; California Board of Medical Examiners; and Twenty-Five Years Ago. For Book Reviews, see index on the front cover, under Miscellany.

NEWS

University of California Medical School.—Promotions, new appointments, resignations and changes in titles on the faculty, 1930 to 1931.

Promotions.—From Associate Professor to Professor: Jacob C. Geiger, Professor of Epidemiology; Charles L. Connor, Professor of Pathology. From Assistant Professor to Associate Professor: Esther Rosencrantz, Associate Professor of Medicine; Francis S. Smyth, Associate Professor of Pediatrics; Alfred H. Washburn, Associate Professor of Pediatrics; Max S. Marshall, Associate Professor of Bacteriology. From Assistant Clinical Professor to Associate Clinical Professor: Fred H. Kruse, Associate Clinical Professor of Medicine; Edwin I. Bartlett, Associate Clinical Professor of Surgery and Pathology; John H. Woolsey, Associate Clinical Professor of Surgery; George K. Rhodes, Associate Clinical Professor of Surgery; Lionel P. Player, Associate Clinical Professor of Urology. From Instructor to Assistant Clinical Professor: Elizabeth A. Davis, Assistant Clinical Professor of Medicine; Raleigh W. Burlingame, Assistant Clinical Professor of Medicine; Lewis S. Mace, Assistant Clinical Professor of Medicine; Harry C. Shepardson, Assistant Clinical Professor of Medicine; Robert C. Martin, Assistant Clinical Professor of Laryngology, Otology and Rhinology; Edward C. Bull, Assistant Clinical Professor of Orthopedic Surgery; Myrl Morris, Assistant Clinical Professor of Pediatrics; Lloyd E. Hardgrave, Assistant Clinical Professor of Pediatrics; Kunisada Kiyasu, Assistant Clinical Professor of Pediatrics. From Assistant to Instructor: Paul S. Wyne, Instructor in Homeopathy; Jessie M. Bierman, Instructor in Pediatrics; Huldah Thelander, Instructor in Pediatrics; Horace Pitkin, Instructor in Orthopedic Surgery; Howard A. Brown, Instructor in Surgery; Lewis F. Morrison, Instructor in Laryngology, Otology and Rhinology; Thomas W. Cornwall, Instructor in Pediatrics; Archie D. Sinclair, Instructor in Pediatrics; Jesse L. Carr, Instructor in Pathology.

Western Branch of the American Urological Association.—The next annual meeting of the Western Branch of the American Urological Association will be held in Los Angeles, September 4 to 6, 1930.

October Clinical Congress of American College of Surgeons.—The twentieth annual Clinical Congress of the American College of Surgeons will be held in Philadelphia from October 13 to 17. In addition to the daily clinics in the numerous and well-known Philadelphia hospitals, five evening programs will be presented. Registration fee for attending the Annual Clinical Congress is \$5.

American Protologic Society.—The 1930 meeting of the American Protologic Society was held at Buffalo, New York, on June 22 to 24, 1930. The following officers were elected for the ensuing year: President, Dudley Smith, San Francisco; vice-president, Samuel E. Newman, St. Louis, and secretary-treasurer, Curcice Rosser, Dallas.

The 1931 meeting will be held at Philadelphia just prior to the meeting of the American Medical Association.

Course in Cardiology in Paris under Professor Clerc.—In October, 1930, a course in Cardiology will be given at Ward Rabelais, Hôpital Lariboisière, 2 rue Ambroise-Paré, Paris, under the direction of Dr. Antonin Clerc, professor.

The classes will meet every morning at 11 o'clock, commencing on October 20, and again every afternoon at 3 o'clock. The morning sessions will be given over to lectures and the afternoon sessions to demonstrations. The fee for the course will be 600 francs.

A certificate, signed by the Professor and the Dean of the Faculty of Medicine of Paris, will be given after the course to every doctor who has attended it regularly.

For further information and registration, apply to the "Association pour le Développement des Relations Médicales," Salle Bédard, Faculté de Médecine, Paris (6^e), or to Professor Clerc, 7, rue de Montchanin, Paris (17^e).

Herzstein Lectures.—Dr. Charles Singer, Lecturer in the History of Medicine at the University of London, England, will give the second Herzstein Lectures, under the auspices of Stanford University and the University of California on August 7, 8 and 9 at 8:15 p. m., in Lane Hall, Stanford University School of Medicine, San Francisco. The titles of the lectures will be as follows:

Thursday, August 7, "Mediaeval and Modern Medicine—Part I"; Friday, August 8, "Mediaeval and Modern Medicine—Part II"; Saturday, August 9, "The Scientific Works of Leonardo da Vinci." All interested persons are cordially invited to attend.

CORRESPONDENCE

Subject of Following Letter: Recent Book Review on "Sterilization for Human Betterment"

To the Editors:

In the April issue of CALIFORNIA AND WESTERN MEDICINE in a brief review of *Sterilization for Human Betterment*, which is based upon the sterilization work in the institution of California, the author, "E. W. T.," uses the following language:

"Many who have no religious or sentimental objections are still unconvinced that the desirable results are being obtained by the operation. The number of operations alone might lead to false conclusions. Sterilizing 5,000 chronic insane or hopelessly feeble-minded, who are destined to spend the rest of their lives in institutions, is useless. What might help would be sterilizing those discharged from institutions, who go back into the world where, if unsterilized, they might reproduce."

The Human Betterment Foundation fully agrees with the author of this review in the last two sentences. In justice to the state of California, the management of its state institutions, and the medical staffs of its several homes for the insane and feeble-minded, we beg to say that is precisely the principle they have acted upon at all times. "Sterilization is done only where there is apparent danger of defective children." (xii Introduction). Patients who have passed the child-bearing age and those destined to remain in the institution are not sterilized. The records show that one in twelve of the insane in the institutions of California since 1909 have been sterilized. Of the new admissions the ratio is higher, about one in six, just enough to cover those considered likely to produce defective children when returned to their homes.

We submit this correction frankly because we are sure that neither your journal nor the author of the

review of *Sterilization for Human Betterment* would knowingly do injustice to the institutions of California or to the Human Betterment Foundation in its constructive work for the betterment of the race.

Very truly yours,
The Human Betterment Foundation,
E. S. GOSNEY, President.

TWENTY-FIVE YEARS AGO *

EXCERPTS FROM OUR STATE MEDICAL JOURNAL

Vol. III, No. 8, August 1905

From some editorial notes:

The American Medical Association Meeting.—It will be impossible to give anything like a report of the Portland meeting of the American Medical Association in our Journal, but some of the more important points may be briefly touched upon, leaving further details for future issues. The registration was very good; quite as large as could have been expected, reaching something over 1,700. . . .

New Officers of the American Medical Association.—At the next meeting of the Association, which is to be held in Boston, Dr. William Mayo, of Rochester, Minnesota, will be installed as president. . . .

Nostrum Question.—The nostrum evil and the advertising of nostrums in the *Journal American Medical Association* received considerable attention, not only by the House of Delegates, but also in the section on Medicine. The first gun was fired on the afternoon of Monday, when the Missouri delegation presented resolutions from their state association, calling for betterment in the *Journal's* advertising pages. This was followed by a resolution introduced by Doctor Jones, of California, to the effect that the trustees be instructed to abide by the rule which they announced in 1895 and in 1900, requiring formulae with all advertisements of remedial mixtures. . . .

Hope For the Future.—The special reference committee, Doctor Billings, chairman, also recommended that the work of the Council on Pharmacy and Chemistry be endorsed, and that the trustees be instructed to provide for its permanent organization. . . .

Hall of Exhibits.—Many of the objectionable so-called "remedies," which have disgraced the hall of exhibits in previous years, were conspicuous by their absence, though there was quite a sprinkling of objectionable things present. . . .

The American Medical Association Directory.—The publication of a directory of all licensed physicians in the United States has been contemplated by the trustees for some time, and in their report at the Portland meeting they recommended the authorization of this work by the House of Delegates and the purchase of the Standard Directory as a valuable aid in the work. . . .

From an article on "*The Diagnosis of Typhoid Fever. A Paper Addressed to the Country Practitioner,*" by Charles Miner Cooper, M. D., San Francisco.

Formerly it seemed as though the isolation of Eberth's bacillus from a patient's blood or excreta would definitely establish a diagnosis of typhoid fever. . . .

. . . The Widal serum test—extremely serviceable, but by no means pathognomonic, and often of no value in early differential diagnosis—has not, by reason of its complex requirements, materially helped the general practitioner. . . .

From an article on "*Practical Application of Functional Diagnosis in Unilateral Kidney Lesions,*" by Drs. M. Krotoszyner and W. P. Willard, San Francisco:

Since our publication upon the newer methods of diagnosing unilateral kidney-lesions appeared we have

* This column strives to mirror the work and aims of colleagues who bore the brunt of state society work some twenty-five years ago. It is hoped that such presentation will be of interest to both old and recent members.

had occasion to apply these methods on a comparatively large number of suspected renal affections. . . .

From an article on "*Second Annual Report of Tuberculosis Committee of the Medical Society of the State of California for the Year 1904-5*":

At the last meeting of the Medical Society of the State of California, the Tuberculosis Committee recommended that the work of the committee be continued for the following purposes. . . .

. . . With the result of our efforts to secure the establishment of a state sanatorium, you are doubtlessly all familiar. We secured the passage of a bill through the legislature, but it died in the hands of the governor. . . .

. . . While we did not secure this much-needed institution for our state, we did not fail. The matter is simply postponed. Those who demanded it this time will continue to do so. They will interest others, and when the legislature meets again, this matter will once more be taken up, and we trust that California will then make provision for her tuberculous poor. . . .

From medical society reports:

Marin County.—It was resolved that no member of the medical society should consult with a lodge physician. . . .

California Academy of Medicine.—The regular meeting of the California Academy of Medicine was held June 27, 1905, the president, Dr. Dudley Tait, being in the chair. . . . The Relation of Hodgkin's Disease to Lymphosarcoma.—Dr. H. W. Gibbons called attention to the great confusion that has arisen in the literature, relative to the nature of certain enlargements of the lymphatic glands. . . .

Redlands Medical Society.—The president, Doctor Sanborn, presented correspondence received from Governor Pardee, in which the governor explained his reasons for vetoing the bill providing for a state sanatorium for tuberculosis. . . .

San Francisco Society of Eye, Ear, Nose and Throat Surgeons.—The regular meeting was held on June 15, 1905, in the rooms of the San Francisco Polyclinic, the president, Doctor Pischel, in the chair. It was decided to tender a banquet to Professor Hirschberg, of Berlin, Doctor Holmes, chairman of the Section on Ophthalmology of the American Medical Association, and to the visiting specialists. . . .

San Francisco Polyclinic Gathering.—Regular meeting, May 3, 1905; the president, Dr. H. A. L. Rytkogel, in the chair. . . . Carcinoma of the Liver.—Dr. J. Wilson Shiels and Dr. C. G. Levison presented a case of exploratory celiotomy for carcinoma of liver.

DEPARTMENT OF PUBLIC HEALTH

SERUMS FOR POLIOMYELITIS*

During the 1927 epidemic the George Williams Hooper Foundation for Medical Research, University of California, working with the aid of an endowment fund for poliomyelitis prepared and distributed 8,000 cubic centimeters of convalescent serum. A constant supply to meet the demands in Northern California is kept on hand. However, in view of the present epidemic and since the expense entailed to collect and to distribute serum is heavy and frequently unsatisfactory it is imperative that each community depend upon its own supply of donors and serum. The following suggestions may assist the health officials in the organization of an efficient bleeding clinic and serum station.

* Other articles on poliomyelitis in this issue by Beatrice Howitt and W. M. Dickie are printed in the Special Articles section of this issue.

(1) List of donors should be kept by the health authorities, and should be periodically checked and their addresses kept up to date.

(2) Notices may be inserted in the daily papers asking all persons who had had poliomyelitis formerly and are willing to give some blood to phone the health department or the hospital in which the bleeding clinic has been established.

(3) Donors should be paid at the rate of \$5 for 50 cubic centimeters of blood or less; \$10 for 50 to 100 cubic centimeters and for larger amounts accordingly.

(4) As donors those persons should be chosen who have passed through a frank attack of the disease. Until additional evidence to the contrary is available it is advisable to consider the serum from convalescent persons who were themselves treated with convalescent serum as unsuitable. Furthermore, irrespective of the recent findings of Aycock and others that the normal adult serum may neutralize the virus no certainty exists that a normal adult, selected at random, may possess such a property.

(5) Blood may be safely drawn after all symptoms of the acute stage have subsided. Serum taken years after an attack still neutralizes the virus and consequently it is reasonable to believe that the property is permanent. Since frequently poliomyelitis donors are not of a robust type the repeated withdrawal of small amounts should be given preference over a large amount of blood at one time.

(6) The apparatus and technique of bleeding the donors are described in an article by Aycock, Luther and Kramer, *Journal American Medical Association*, 1929, Vol. 92, pp. 385-388. Special instructions may be obtained from the Hooper Foundation, Second and Parnassus Avenues, San Francisco, California.

(7) Each serum should be subjected to a Wassermann and sterility test, according to the usual standard procedures. When collected aseptically it may be put up in vials or ampoules without preservatives. If the serum is kept for any length of time the addition of a preservative such as chinolol 3.3 per cent of a 2 per cent aqueous solution or tricresol 0.2 per cent. *Preserved serum should not be used for intrathecal injections.*

(8) For the purpose of investigation of the suspected preparalytic cases and the administration of the serum the health offices should appoint one or two consultants.

(9) The available data are insufficient to determine the best method of administration or the dosage of convalescent serum required to secure the best result. Not infrequently the dosage has been regulated rather by the supply and demand than by any definite information as to its adequacy. Aycock and his associates recommend lumbar puncture and intrathecal administration of 20 cubic centimeters followed by the intravenous injection of 60 cubic centimeters of serum. *The intrathecal injections should never be repeated.* Reactions, such as an increase in the meningeal signs, chill with a sharp rise in temperature, abdominal distress, are frequently encountered. In California, Shaw, Thelander and Fleischner in 1925 and again Shaw and Thelander in 1928, reported favorably on the intramuscular injection of 50 cubic centimeters of serum in one dose for children under five years of age. If the patient is over five years, 100 the severity of the symptoms. During the Canadian epidemic, 1928 to 1929, at Manitoba, the Medical Research Committee of the University recommended exclusively the *intramuscular injection* of 25 cubic centimeters of convalescent serum as a standard amount. From the reports given the results of the treatment appear very encouraging. *During an epidemic the intramuscular route of administration is considered the simplest and safest method.*

(10) The use of *convalescent serum as a prophylactic* in the event of a severe poliomyelitis epidemic had been suggested in 1928 by Davide in Sweden and by Flexner and Stewart in the United States. Although the available evidence to support the efficacy of this procedure is inconclusive it is recommended that chil-

dren receive ten cubic centimeters and adults twenty cubic centimeters of the serum subcutaneously, the injections to be repeated after four to six weeks if the epidemic persists.

INFANTILE PARALYSIS*

1. What Is "Polio"?—Acute Anterior Poliomyelitis (Infantile Paralysis).

An acute systemic infectious disease which in a limited number of cases tends toward an involvement of the gray matter of the central nervous system, capable of causing widely disseminated lesions throughout the tissues of the brain and cord. The toxin produced in this disease has a special affinity for destroying the gray matter or motor tracts and seldom affects except indirectly the sensory tracts. The disease occurs spasmodically, but has strong epidemic propensities. It is of sudden onset and is a disease preëminently of childhood and young adults.

2. *What Do We Know About Its History?*—It is of comparative recent origin. First recognized for what it really was, an epidemic disease, by Michael Underwood in his "Diseases of Children," published in 1784. In 1884 an epidemic started in Stockholm, Sweden, and since that time has spread intermittently all over the world. Where it once attains a foothold there it remains, occurring spasmodically or rather mildly endemic, occasionally lighting up into epidemics, always leaving a train of death and three times as many more crippled children in its wake. The rattlesnake and deadly cobra give some warning and against them man has battled successfully; but this, a thing more deadly and unseen, remained for many years a dreaded mystery, seemingly unsolvable. Like measles and other infectious fevers, the first epidemics in a people new to its manifestations have been more virulent and deadly, with a larger number of people affected than in epidemics following. The first real epidemic came to Los Angeles in 1913, with 242 cases and 47 deaths. We had had a few cases now and then for a couple of years before. It has been with us ever since and has assumed epidemic proportions at times.

3. *Will This Be a "Polio" Year?*—"Polio" has generally manifested its epidemic propensities in the summer months. June is ordinarily considered the key month. If there is considerable of a rise in June we look for more in July, August, September and October. In the city of Los Angeles, with three cases in March, seven in April, eight in May and over fifty in June, we can look forward to cases of infantile paralysis until the warm weather is over.

4. *What Is the Cause of "Polio"?*—It has been proved that a filterable virus carrying the infection is responsible (Flexner and Lewis in 1909) and this same year three different observers working independently succeeded in transmitting the disease from one monkey to another.

5. *What Has Been Learned by Research and Experimentation?*—The early investigations showed diplococci, streptococci or micrococci in the spinal fluid. These organisms are probably secondary invaders and some of them, grown under anaërobic conditions, assume the shape of the globoid bodies described by Flexner and Noguchi. All of these can be filtered out and the filtrated fluid will still produce the disease in monkeys. The usual laboratory animals, rabbits, guinea pigs, etc., are not suitable for experimentation; of all animals only monkeys are affected with the same systemic and cerebrospinal involvement as in man. It has been definitely established that the virus gains entrance into the blood, lymphatics and central nerv-

(Continued on Page 34, Advertising Section)

* Being a paper printed by George Parrish, M. D., Health Officer of the City of Los Angeles. Paper written by George M. Stevens, M. D., Epidemiologist of the Los Angeles City Health Department. Because of the large number of cases of infantile paralysis which have come into existence in California during the last two months, it seems proper to give as much publicity to this epidemic as possible. On that account several articles on the subject of poliomyelitis are printed in this August issue of "California and Western Medicine."